Three Essays in International Microeconomics

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to my father

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Introduction

The worldwide export of services and goods and its importance for world GDP has greatly increased in the past decades. A large part of this increase is due to lower trade costs, on one hand in the form of reduced tariffs. In continuation of the General Agreement on Tariffs and Trade (GATT) in 1947, for example the Uruguay Round from 1986 to 1994 came with an average reduction of ad valorem tariffs from 17 percent to 10 percent (Caliendo *et al.*, 2017). On the other hand, transportation costs have been vastly decreasing as well, from quicker loading times and cheaper air transport costs (Hummels, 2007) to modern (tele-)communication.

However, despite this long-standing major trend towards internationalization, we are still far away from full globalization. As is compellingly shown by Head and Mayer (2013), the actual level of trade openness (overall imports of goods and services relative to world GDP) is only a third compared to a hypothetical friction-less world, which suggests that significant barriers to trade remain beyond the greatly decreased transportation costs and tariffs. The general idea of more intangible trade costs that remain, like cultural and behavioral aspects, relates to the second and third chapter of this thesis, where we analyze deeply ingrained national preference structures as a potential cultural force, directly and indirectly affecting individual's behavioral decisions and actions, and how it relates to specifically trade outcomes.

The first chapter also broadly considers incomplete globalization, but from a completely different perspective. There, we are considering newly arisen incentives to deliberately set up formal barriers in the form of tariffs by including environmental innovation incentives in the analysis.

In a setting of rent-extracting strategic trade policy with endogenous firm investment into production technologies, this first chapter deals with environmental concerns by a government. The simple analysis reinforces the importance of investment incentives caused by tariffs in general, but shows that the resulting implications for the optimal tariff decision can be completely different between traditional tariff considerations and an environmentally conscious government. We show that an importing country in a dynamic setting with endogenous firm technology choices prefers to impose discriminatory tariffs both ex post and ex ante when emissions matter, while - as previously found in the literature (e.g. Choi, 1995) - a commitment to uniform tariffs is optimally chosen when environmental concerns do not play a role. The main contribution of this paper is to show that tariffs (and taxes) may not only become prominent again as a form of direct punishment for dirty production technologies, but that they also dynamically provide the right innovation incentives to

decrease emissions globally.

The second paper makes use of the Global Preference Survey (GPS) by Falk *et al.* (2018) and its data of unique scope on national preference structures in patience, risk attitude, reciprocity, trust and altruism, the second chapter explores a potential influence on international trade outcomes of this broad set of economic and social preferences in a unified setting. We add to the literature on preferences' importance for aggregate outcomes and reveal distinct relationships between national preference leanings and marked differences in trade flows and relationships, both on the country-level and between bilateral partners. Our main results suggest that countries differing in their willingness to behave negatively reciprocal tend to trade significantly less amongst each other, while countries that are patient or risk-averse tend to shift towards exporting more differentiated goods as opposed to homogeneous goods and vice versa.

In the third paper, we exploit a comprehensive trade panel data set that includes intra-national flows for a novel empirical strategy to identify the effect of national economic preferences - patience, risk attitude, negative reciprocity and pro-social preferences from the Global Preference Survey (GPS) - on external trade in a gravity approach, while still being able to crucially control for multilateral resistances by the proper fixed effects. We use a series of further identification approaches to compare the results and to disentangle channels for the impact of economic preferences on trade. We find that especially patience and risk aversion tend to foster external trade across the board. Additionally, we formally analyze the interaction effects of preferences and institutions. Our findings suggest that preferences may act as substitutes for bad formal institutions to some extent.

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Chapter 1

Optimal Tariffs and Firm Technology Choice: An Environmental Approach

1.1 Introduction

For years, countries under the umbrella of the World Trade Organization (WTO) have concurred to promote a cooperative trade outcome and to punish those that unduly try to extract rents from importing firms through trade restrictions. The most favored nation (MFN) clause to prevent discrimination between trading partners is often regarded as the fundamental pillar of the WTO and the General Agreement on Tariffs and Trade (GATT) (e.g. Bagwell & Staiger, 1999) and exhibits several potentially welfare-improving features in various contexts (see e.g. Choi, 1995, Saggi, 2004)[1].

A real agreement over global climate policy, however, has not been achieved as of yet. While alarms about environmental damage, climate change and the like are undoubtedly a major and rising global concern, they do not appear to be of equally high priority for all countries so far. Even within OECD countries, for instance, stark differences in terms of the extent of environmental policies are still present (Botta & Koźluk, 2014) and even more so for less integrated countries. Countries that *have* decided on a need to impose carbon reduction mechanisms are nonetheless concerned about the competitiveness of local firms and about the possibility of "carbon leakage" (cf. Babiker, 2005) when other countries do not implement similar policies. If production simply moves to jurisdictions where no environmental measures such as a carbon reduction program are in place, potential reductions in the home country can be nullified or even surpassed. To compensate for arising problems like these, in contrast to years of politicians and scholars promoting trade liberalization, some are suggesting the increased use of differentiating measures again (e.g. Stiglitz, 2006, Ismer & Neuhoff, 2007); one of these being tariffs based on imports' carbon emissions as a relatively effective measure with the least prospect of legal and practical barriers (cf. Böhringer et al., 2014).

In the analysis presented here, we consider a model setting of rent-extracting strategic trade policy in oligopolistic competition in the spirit of Brander & Spencer (e.g. 1984a, 1984b) with endogenous firm investment into production technologies. A main focus lies on the importance of providing dynamic innovation incentives to firms and considering imperfect competition à la Cournot[2]. The oligopolistic frame-

[1] Also cf. Horn & Mavroidis (2001) for a broad survey covering more legal aspects as well.

[2] Following Kreps & Scheinkman (1983), we assume that the results hold under Bertrand competition as well when taking into account a preceding capacity build-up before price competition takes place. In a trade context, this sequence appears particularly plausible.

work is well-suited for analyzing the strategic interaction among firms and between firms and governments. Importantly, it is also able to cover homogeneous goods industries and a limited set of large dominant firms. Significant shares of world emissions are directly or indirectly generated by industries such as oil, gas and electricity, iron, steel and cement and by the agricultural sector (e.g. Herzog, 2009), all representing highly homogeneous products.

In a simple analysis of a government additionally considering environmental damages caused in the production process of foreign exporters, we will show that the results of traditional tariff considerations dealing with standard production costs need not necessarily apply any longer. The result of Choi (1995) that a commitment to uniform tariffs by a MFN clause provides higher incentives for foreign firms to invest into cost-saving technologies is turned around in the environmental setting presented here. We will show that discriminatory tariffs are optimal for the tariff-setting government both in the short and in the long-run view with respect to foreign firms' emission reduction incentives.

Section 2 of this paper starts by introducing the general framework and re-collecting the standard marginal cost results for comparative purposes. Then, we adjust this model to fit into the environmental context and results are derived and compared. The environmental model is then extended by adding a third firm from the home market. Concluding remarks follow.

1.2 Carbon Tariff Model

We consider a three-stage game played between a government in a home country and two foreign firms located in two different foreign countries. All sales and consumption can only occur in the home country. Firms are symmetric ex ante, and we consider the case of linear demand $P = a - bQ$ where $Q = q_1 + q_2$.

In the first stage of the game, firms can choose their technology determining its respective (emission) costs e_1 and e_2. Spending a higher (and marginally increasing) sunk fixed cost achieves lower marginal costs in this technology investment stage. This relationship is represented by the function $F = \Phi(e)$ and we assume $\Phi' < 0$ and $\Phi'' > 0$ to capture the mentioned trade-off. In the second stage, the home government decides on the import tariffs t it imposes on the foreign firms. In the last stage, given that technologies and tariffs are in place, the firms compete à la Cournot and the Nash equilibrium is determined.

We consider two different possible ways of setting tariffs. Under a uniform setting, the government sets the same tariff to all countries and firms, while tariffs may vary between different countries under a discriminatory (or preferential) regime. Initially, assume that the government can freely choose between the two.

1.2.1 A Standard Tariff Model

The setup used here builds on the model introduced by Choi (1995). We briefly recapture his results in order to directly compare the environmental outcomes and highlight the arising differences.

In the non-environmental setup by Choi, at the stage of technology investment with $F = \Phi(c)$, a higher fixed cost achieves lower marginal standard production costs c_1 or c_2.

Solving by backward induction, maximizing both firms' profits, we get intermediate equilibrium quantities of

$$q_i(\mathbf{c};\mathbf{t}) = \frac{a - 2c_i - 2t_i + c_j + t_j}{3b}, \quad i = 1, 2, \quad i \neq j \tag{1.1}$$

with c_i and t_i being a firm's own cost and tariff to be faced and c_j and t_j representing the competitor's cost and tariff. The government then considers the following welfare function by anticipation of firms' behavior

$$W(\mathbf{t};\mathbf{c}) = CS + t_1 q_1(\mathbf{t},\mathbf{c}) + t_2 q_2(\mathbf{t},\mathbf{c}). \tag{1.2}$$

Optimal tariffs are then given for the preferential (t^*) and uniform tariff (t^{**}) regimes by

$$t_i^*(\mathbf{c}) = \frac{2a - 3c_i + c_j}{8}, \quad i = 1, 2, \quad i \neq j \tag{1.3}$$

$$t^{**}(\mathbf{c}) = \frac{2a - c_i - c_j}{8}. \tag{1.4}$$

We can see that a government which would observe one low-cost and one high-cost firm, would have an incentive to raise the low-cost firm's tariffs and lower the high-cost firm's tariffs compared to a uniform tariff. Given such an ex post cost structure across firms, it can be shown that it would be welfare-maximizing for a government to set discriminating tariffs in this way and the effective cost-differential of production costs plus tariffs between a low-cost producer and a high-production-cost firm is

reduced by the optimal tariffs.

To see the basic intuition behind this result, we can draw an analogy of the home government as an intermediate supplier to the foreign firms, with the intermediary good being "the right to sell in the home country". A firm with low production costs wants to sell more, therefore has a higher demand c.p. for this right to sell and will exhibit a lower elasticity of demand because of it. This low elasticity can be exploited by the government by charging a discriminating high price, that is, by setting higher tariffs.

We then consider the first-order conditions from the technology choice stage and compare them for the discriminatory (c^*) and the uniform (c^{**}) regime:

$$\Phi'(c^*) = -\frac{3(a - c^*)}{16b} \tag{1.5}$$

$$\Phi'(c^{**}) = -\frac{5(a - c^{**})}{16b} \tag{1.6}$$

It follows that $c^{**} < c^*$ in equilibrium. To see this, note that the marginal profit (RHS) of further lowering cost is always higher under the uniform regime at any *given* level of c. This means that firms have stronger incentives to decrease their cost and in the end choose a lower-cost technology when they face uniform tariffs. This creates a dilemma for the government. It wants to charge discriminating high tariffs to low-cost firms, but in equilibrium both firms choose the same cost level after all, because any firm incentive to unilaterally decrease costs is negated by the expected discriminatory tariff. Therefore, no additional tariff income can be gained compared to uniform tariffs in the static sense. Additionally, because of the investment dynamics, there is a further welfare loss due to firms investing too little in cost reductions when they have to anticipate the possibility of discriminatory tariffs, which results in higher prices for the home consumers. Because tariffs will be de facto uniform in any equilibrium and the mere possibility for the government to opt for preferential tariffs leads to less investment and higher production costs for firms, the government is better off by restricting itself ex ante from using them. Here, voluntarily subscribing to a MFN clause and thereby credibly restricting oneself to uniform tariffs, is working as a commitment device to overcome the time-inconsistency problem of ex ante vs. ex post government tariff incentives.

1.2.2 The Environmental Model

We now further consider the situation of a government that also pays attention to the environmental damage caused in production. As a first step of changing the model by Choi, we use the environmental emission cost e in addition to classic marginal unit costs. Firms can only decrease their emission level e instead of their raw cost level c. That is, we hold the raw production cost constant at $c = \overline{c}$[3]. For this, consider a situation in which production is already operating at the border of technology in the sense that no further cost improvements in terms of real production costs can be made. However, assume that this current means of production still exhibits an emission cost which can be reduced by investing into, for example, filter vents or recycling techniques of varying qualities. For simplicity, we also normalize to $\overline{c} = 0$ w.l.o.g.

The model is solved by backward induction. In the third stage, firms maximize their profits *given* technologies and tariffs. The home country can demand import tariffs from the foreign firms and tariffs are collected in the form of $T = \sum t_i q_i$. Profits of the foreign firms are then given by

$$\pi_i = (a - b(q_1 + q_2) - t_i)q_i, \quad i = 1, 2 \tag{1.7}$$

It is important to note that marginal environmental costs e_i do not enter the profit function directly at this point. This nicely represents the externality character of the issue, as firms do not have an inherent incentive to reduce these costs in the absence of external intervention. We will see that the analyzed tariffs set by the importing country's government will force firms to consider the environmental emission costs they are producing. Here, tariffs are working in an indirect way, providing a potential instrument e.g. when direct governmental regulation is not possible.

Resulting from optimization of Eq. (1.7), we get the outputs resulting from the third-stage Cournot-Nash game with $\mathbf{t} = (t_1, t_2)$ as

$$q_i(\mathbf{t}) = \frac{a - 2t_i + t_j}{3b}, \quad i = 1, 2, \quad i \neq j. \tag{1.8}$$

[3]Another natural assumption would be a negative relationship between cost level and emission rate, i.e. $c'(e) < 0$. While this would provide a somewhat countervailing effect to the following results, both in the investment stage as well as for tariff-setting, we abstract from this for the sake of brevity here and focus on the channel caused by environmental investments.

In the second stage, the home government sets tariffs to maximize

$$W(\mathbf{t}) = (1-u)[CS + t_1 q_1(\mathbf{t}) + t_2 q_2(\mathbf{t})] - u[e_1 q_1(\mathbf{t}) + e_2 q_2(\mathbf{t})], \quad u \in [0,1). \quad (1.9)$$

On one hand, it considers the consumer surplus CS in the home country and the tariff revenues it collects from the foreign firms. These "classic" considerations are weighted here by (1-u). The interesting addition here is the latter term that depicts environmental costs like carbon emissions and enters the welfare function negatively. The parameter u therefore measures how much weight the government wants to put on the environmental considerations compared to the classic objectives.
Again, we analyze the potential tariff choices of the home government. Now, under a discriminatory tariff system, welfare maximization and the ensuing first-order conditions yield the following *optimal discriminatory tariffs* denoted by t^*, taking as given the firms' technologies $\mathbf{e} = e_1, e_2$

$$t_i^*(\mathbf{e}) = \frac{2a(1-u) + 5e_i u + e_j u}{8(1-u)}, \quad i = 1,2, \quad i \neq j. \quad (1.10)$$

Comparing to Eq. (1.3) from the non-environmental setting nicely shows an important difference: the sign for the own costs e_i is now positive.
In the setting without the environment, the optimal discriminatory tariffs set by the government would decrease the effective cost differential between a high- and a low-cost producer by imposing higher tariffs on the low-cost producer. Thereby, the incentive to invest into cost-reducing research is lowered for all producers[4]. However, when we now look at the tariffs in a situation of a government that cares for environmental costs caused by emission, we can see that firms will be rewarded for lower emissions through lower import tariffs, reinstating the incentive to invest into R&D. Note that the competing importing firm j will also slightly benefit from a reduction of the own costs of i, which can be seen from the positive sign on competitor's costs e_j. This can decrease the incentive to invest to some extent by also allowing a partial free-riding effect. Nevertheless, the positive sign on the competitor's technology is a result that carries over from the non-environmental analysis, but here, the positive effect on being able to reduce the own tariff to be faced clearly outweighs this factor.

[4]DeGraba (1990) already highlighted this insight analogously for the setting of an input supplier who price discriminates between downstream producers based on their production costs.

Solving for the optimal non-discriminatory tariff t^{**} is straightforward, again from the maximization of welfare with the additional restriction that $t_1 = t_2$ has to hold:

$$t^{**}(\mathbf{e}) = \frac{2a(1-u) + 3e_1u + 3e_2u}{8(1-u)}. \tag{1.11}$$

Looking at the signs for emission costs $\mathbf{e}$ in comparison to the respective cost counterpart $\mathbf{c}$ in Equ. (1.4) of the initial setting, we see that they are also flipped. This means that lowering one's emissions now has a benefit for a firm in the sense of lowering the tariff to be faced. However, due to the uniform tariff, the effect of lowering the emission cost also benefits the competing importer in the same magnitude. In the non-environmental results, while the effects go in the opposite direction, they are the same for the own firm and the import competitor as well. Considering only the point of view of competition with the other foreign firm, tariffs under a MFN regime play no further role for the firms' considerations on costs, neither in the environmental case nor with traditional production costs.

Still, in both setups, firms will have an incentive to lower their own costs, stemming from different channels in the different cases. In the model with classic marginal costs, firms have a general incentive to lower their costs for standard competitive reasons in strategic interaction. Introducing an MFN tariff reduces this incentive by demanding higher tariffs on imports with lower costs, but then equally so for both firms. Under the discriminatory regime, in response to a fall in the cost c_i, tariff t_i is raised even more drastically while t_j on the other firm is actually *decreased*, which dampens investment incentives further as explained in the previous section.

In the environmental case, firms have no inherent incentive to lower their emission costs at all. Introducing tariffs on these emissions can now work to establish this incentive in such a setting. In this case, a MFN tariff will be set in such a way that it already gives some incentive to the importers to lower their costs. While the other importer can actually free-ride and partake in an equal amount on the cost-savings and benefits of the cost-reducing firm, both benefit from lower tariffs.

Here, the optimal tariffs set by a discriminatory regime can lead to even better results in terms of investment incentives by letting the cost-saving firm enjoy a higher benefit in the form of a lower tariff than the competitor. As stated before w.r.t. Eq. (1.10), the other firm is also allowed a somewhat lower tariff, but the now increasing effective cost differential, which is given here by the tariff differential only, would still allow a single cost-saving firm to expand its output relatively more

while forcing the importing competitor to lower its output, as can be seen in the following equation[5] .

$$q_i^*(\mathbf{e}) = \frac{2a(1-u) - 3e_i u + e_j u}{8(1-u)b}, \quad i = 1, 2, \quad i \neq j. \tag{1.12}$$

This already points towards the result that innovation incentives will be higher in the preferential setting here.

Finally, we look at the first stage of the game, where technology choices are made. In the timing of the game, we implicitly assume that firms can set their technologies anticipating the resulting trade policies by the government. At least in the short and medium-run, we believe this to be a plausible assumption. A commitment to discriminatory or uniform tariffs would usually be given by public international contracts and policies, with political processes presumably being more rigid than firms' technology decisions. A country's stance on environmental considerations - represented in the model by term u- will also likely be public common knowledge, at least by tendency, derived from public political statements etc.

We compare the first-order conditions to now show analytically that in the environmental setup introduced in this paper, indeed lower emissions will be chosen under the discriminatory regime, as it has been already claimed intuitively from the comparison of the two setups.

Proposition 1. *Let e^* and e^{**} be the symmetric Nash equilibrium technology choices under the discriminatory tariffs and an MFN clause on carbon tariffs, respectively. Then, under linear demand and a reasonably low environmental weight $u \leq \frac{a}{a+e}$ [6], we get $e^* < e^{**}$. That is, a less carbon emitting and therefore environmentally beneficial technology is chosen by firms in the discriminatory regime.*

Proof. At the technology decision stage, the firms maximize

$$\Pi_i[\mathbf{e}; \mathbf{t}(\mathbf{e})] = \pi_i[\mathbf{e}; \mathbf{t}(\mathbf{e})] - \Phi(e_i) \tag{1.13}$$

which yields from $\frac{\partial \Pi_i}{\partial e_i} = 0$ and $\Phi'(e_i) = \frac{\partial}{\partial e_i}\pi_i[\mathbf{e}; \mathbf{t}(\mathbf{e})]$ the conditions under the

[5]The arising technical analytical limitations are briefly discussed in the appendix. However, these do not affect the analysis of results for plausible parameter values.

[6]The low weight u is only needed to generally stay in the range of analytically feasible solutions, see the appendix for the derivation of the condition.

discriminatory tariff regime (e^*) and the MFN regime (e^{**}) respectively:

$$\Phi'(e^*) = -\frac{3}{16}\frac{u}{(u-1)^2}\frac{a(1-u)-e^*u}{b} \tag{1.14}$$

$$\Phi'(e^{**}) = -\frac{2}{16}\frac{u}{(u-1)^2}\frac{a(1-u)-e^{**}u}{b}. \tag{1.15}$$

On one hand, it must hold that $\Phi'(e) < 0$ which also implies here that operating profits π_i naturally rise with falling costs. If u is sufficiently low, i.e. in the generally feasible range, the term $a(1-u) - e^*u$ becomes positive and $\Phi'(e) < 0$ is fulfilled. From $\Phi'(e^*) < \Phi'(e^{**})$ for any given e it can be deduced that $e^* < e^{**}$. For a given level of e, marginal additional profits from lowering costs are always higher in the discriminatory case. Therefore, marginal profits will surpass the marginal cost from investing in cost reduction for a lower range of e and a lower cost level, here in terms of emission costs, is chosen in the discriminatory equilibrium. □

This is in contrast to the case without emissions, where the result was $c^{**} < c^*$.
Next, we evaluate the respectively achieved welfare levels. In equilibrium, the ex ante symmetry of firms carries over and both firms choose a common cost level, resulting in the following Home welfare:

$$W(e) = \frac{a^2(u-1)^2 + 2aeu^2 + e^2u^2 - 2aeu}{4(1-u)b}. \tag{1.16}$$

Apart from a lower total environmental cost, lower emissions lead to a higher consumer surplus and lower tariff income through lower tariffs. Overall, the effect of lower emissions on equilibrium welfare is strictly positive in the feasible parameter range, as we show in the appendix.
Even though it can also be shown that the sum of welfare in the Home country and *operating profits* of the two foreign firms is also increasing with lower emissions costs for the feasible range, we cannot make a definitive statement on final world welfare. Further analytical assumptions about the exact nature of the technology investment function would need to be made on top of the issue that we assume completely different welfare standpoints in terms of the valuation of environmental issues and therefore, a clean comparison of an agreed upon world welfare would be difficult to draw.

1.2.3 Home Firm Extension

As a robustness check, we now additionally consider a third firm that is located in the home market. This fits the notion of a country that is interested in reducing emissions and can do so on one hand by introducing a mechanism to guide the emissions by its local firm, but on the other hand has no political reach over the foreign firms except for the border tariffs that it can set on imports. Naturally, the welfare function will consider an additional term stemming from the producer rents of the home firm.

Again, we solve by backward induction and start by looking at the third stage first. There, firms maximize their profits given technologies and set tariffs. Demand is still given by $P = a - bQ$, where now $Q = q_h + q_1 + q_2$.

Profits of the home firm h take the form of

$$\pi_h = (a - b(q_1 + q_2 + q_h) - \overline{e})q_h \tag{1.17}$$

where $\overline{e}$ represents an at this point exogeneously given rate to be paid for emissions by the home firm. One interpretation here is that this rate is assumed to be what emerges from an efficient and well-functioning emission market that is in place in the *home* region, but cannot be employed for $foreign$ firms, e.g. due to a lack of political agreements with foreign countries. For simplicity, we also normalize this rate to $\overline{e} = 0$. While we do not explicitly allow for aspects such as carbon leakage, firm-delocation etc. in the model, the considered stylized setting is rather applicable to a situation where delocation might have already occurred. The firms considered here as foreign firms can also be viewed as previous home firms that moved away or offshored their production in response to the local pollution measures.

As in the previous section, the home country can demand (potentially discriminatory) import tariffs from the foreign firms. Profits of the foreign firms are then given by

$$\pi_i = (a - b(q_1 + q_2 + q_h) - t_i)q_i, \quad i = 1, 2 \tag{1.18}$$

In the second stage, the home government sets tariffs to now maximize

$$W(\mathbf{t}) = (1 - u)[CS + \pi_h(\mathbf{t}) + t_1 q_1(\mathbf{t}) + t_2 q_2(\mathbf{t})] - u[e_1 q_1(\mathbf{t}) + e_2 q_2(\mathbf{t})], \quad u \in [0, 1). \tag{1.19}$$

The first-order conditions solve for the following optimal discriminatory tariffs denoted by t^* and uniform tariffs t^{**} respectively, again taking as given the firms'

emission technologies $\mathbf{e} = e_1, e_2$

$$t_i^*(\mathbf{e}) = \frac{6a(1-u) + 13e_i u + 3e_j u}{20(1-u)}, \quad i = 1, 2, \quad i \neq j. \tag{1.20}$$

$$t^{**}(\mathbf{e}) = \frac{6a(1-u) + 8e_1 u + 8e_2 u}{20(1-u)}. \tag{1.21}$$

Tariffs overall are set more aggressively in this setting, which is to be expected. Raising the foreign competitors' costs by the tariffs now has the added advantage of increasing the home firm's profits. In addition, the creation of consumer rent is not solely dependent on foreign firms anymore. Both of these channels tend to increase the foreign tariffs set by the home government.

We can check that the greater investment incentive and therefore lower emissions chosen by the firms are still given by discriminatory tariffs in this extended setting. The first-order conditions at the technology stage are given for the discriminatory tariff regime (e^*) and the MFN regime (e^{**}) respectively by

$$\Phi'(e^*) = -\frac{9}{100}\frac{u}{(u-1)^2}\frac{a(1-u) - 4e^* u}{b} \tag{1.22}$$

$$\Phi'(e^{**}) = -\frac{4}{100}\frac{u}{(u-1)^2}\frac{a(1-u) - 4e^{**} u}{b} \tag{1.23}$$

The relative dominance of investment incentives under the preferential regime is even amplified now that the home firm is taken into account.

1.3 Concluding Remarks

The simple analysis of a government considering environmental damages caused in the production process of foreign exporters has shown that traditional tariff considerations facing standard production costs need not apply in this case. The result of Choi that an MFN clause provides higher incentives for foreign firms to invest into cost-saving technologies is turned around in the model presented here. Now, discriminatory tariffs are optimal for the tariff-setting government both in the short- and in the long-run view by incentivizing firms' investments into green technologies. In the setting of investments into a reduction in standard production costs, tariffs overall actually dampened the incentive to engage in R&D that has both a global

social benefit as well as a private benefit to the foreign exporters. The mere prospect of the home government potentially charging differentiating tariffs creates a commitment problem in addition, without any ex post benefit. The environmental setting represents a different issue with the foreign firms having no inherent incentive to achieve a reduction in emission costs and creating a negative externality on the home region. Here, tariffs work as an instrument to create an investment incentive for foreign firms in the first place and discriminatory tariffs provide the stronger incentive to reduce emissions even further.

The model implies the suggestion for environmentally conscious governments to drop MFN clauses altogether as an extreme case. There is an ongoing discussion if and in how far discrimination based on environmental aspects indeed might or should be reconciled with WTO guidelines (e.g. Ismer & Neuhoff, 2007, Balistreri et al., 2019). Even potentially risking WTO violation punishments and trade retaliation in the absence of a common agreement and to weigh such a potential backlash against possible benefits of decreasing emissions are considered as an extreme option (cf. Fouré et al., 2016).

In any case, the potential effects that can be caused by the investment incentive channel highlighted in the model presented here need to be taken into consideration when countries decide on both tariff and environmental policy measures. While we believe that the model in its current stylized form can already provide an important benchmark for a variety of particularly relevant real world circumstances, future work can expand these insights in detail to a more general framework in terms of demand and technology functions, differentiated goods industries and more.

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Appendix

A.1 Feasibility Restriction on u

Let us consider again the equilibrium firm quantities, given the respective optimal tariffs

$$q_i^*(\mathbf{e}) = \frac{2a(1-u) - 3e_i u + e_j u}{8(1-u)b}, \quad i = 1, 2, \quad i \neq j. \tag{A.1}$$

$$q_i^{**}(\mathbf{e}) = \frac{2a(1-u) - e_i u - e_j u}{8(1-u)b}, \quad i = 1, 2, \quad i \neq j. \tag{A.2}$$

For values of u approaching 1, the numerators would take on negative values, which is not feasible. The intuition is the following: the more and more a government cares for the environment, the more it will aim to restrict the emission causing production by the importers completely. Therefore, as can be also seen in Equs. (1.10) and (1.11), optimal tariffs for u moving towards 1 would approach ∞. In reality, it would suffice for a government to set prohibitively high *finite* tariffs in order to foreclose production and thereby avoid any emissions. More generally, to stay in the relevant range, it needs to hold that

$$q(\mathbf{e}) \geq 0, \tag{A.3}$$

as negative quantities are not feasible. Here, we impose symmetry of costs w.l.o.g. Due to the ex ante symmetry of importing firms, they will also symmetrically choose their optimal level of costs. This leads to the following condition:

$$\begin{aligned} & 2a(1-u) - 2eu \geq 0 \\ \Leftrightarrow \qquad & u \leq \frac{a}{a+e} \end{aligned} \tag{A.4}$$

No definite prediction can be made here, but given that a is likely to be quite larger than e, this condition is likely to hold[7]. Any values of $0.5 < u < 1$ would actually mean that a government puts *more* weight on the environmental considerations than on its traditional objectives, i.e. consumer and producer surplus and tax income, which is needed to fulfill its governmental tasks. This is, at least for the moment, very unlikely, so the analysis is very likely to hold under realistic values of a relatively small u.

A.2 Emissions & Welfare

As we argue in section 1.2.2, welfare is rising with lower emission costs. Equilibrium welfare is given by:

$$W(e) = \frac{a^2(u-1)^2 + 2aeu^2 + e^2u^2 - 2aeu}{4(1-u)b}. \tag{A.5}$$

[7]See Choi (1995,p.154) where the assumption $(a - c) = 100$ is made.

It needs to hold that

$$W'(e) < 0$$
$$2au^2 + 2eu^2 - 2au < 0$$
$$u < \frac{a}{a+e}. \tag{A.6}$$

This is the same restriction already imposed in A.4, therefore lower emissions will always lead to a higher Home welfare in the feasible parameter range.

Chapter 2

Economic Preferences and Trade Outcomes

Co-authored with Alex Korff

My contributions to this chapter are as follows:

- developing the idea of the paper jointly with my coauthor,
- constant feedback and discussion on empirical analysis to my coauthor,
- writing and revising the paper jointly with my coauthor.

2.1 Introduction

This paper explores a potential influence of the preferences patience, risk attitude, reciprocity, trust and altruism and its aggregate national structures on international trade outcomes. In that context, we are the first to make use of the Global Preference Survey (GPS) by Falk *et al.* (2018, 2016) and its data of unique scope and quality. While the existence of substantial differences across individuals, groups and populations is undisputed (cf. Rieger *et al.*, 2015), meaningful cross-country or even global comparisons have been difficult. The GPS provides a larger, more extensive set featuring representative data on these decision-relevant preferences for 76 countries and 90% of world population, using a carefully designed, standardized and experimentally validated set of elicitation and survey questions. Our main results suggest that countries that differ in their willingness to behave negatively reciprocal tend to trade significantly less amongst each other, while countries that are patient or risk-averse tend to shift towards exporting more differentiated goods overall instead of homogeneous goods and vice versa.

The GPS defines and measures six dimensions of *economic preferences*. Two of them, Time preferences (patience) and risk attitude, are arguably im- or even explicit to all economic models and decision-making. The other four dimensions, trust, altruism and both positive and negative reciprocity, are addressing the social element of economic exchange. Altruism can be viewed as an independent concern for the well-being of others. Trust is evaluated in the GPS by agreement to the statement: "People have only the best intention" - a rather abstract, generalistic definition. While the positive impact of trust on development and economic performance has long been recognized by Arrow (1972) and Knack and Keefer (1997)[1], has even been linked to trade by Guiso *et al.* (2009) or Yu *et al.* (2015)[2], their group-specific measures are not immediately comparable to the GPS. For these reasons, trust does not receive the focus in this analysis - despite undeniably being the preference most prominent in the literature[3]. While positive and negative reciprocity superficially appear to be just two directions of the same notion, they are actually two distinct and rather unrelated concepts in practice, as indicated by a lack of correlation between the two measures (cf. Dohmen *et al.*, 2008, Falk *et al.*, 2018). Positive reciprocity

[1]The interplay with institutions and the causal effect of trust through facilitating cooperation and reducing transaction costs through the channels of finance, innovation, labor markets and more is nicely summarized in a survey by Algan and Cahuc (2014).

[2]Both use bilateral trust which they relate specifically to the common histories between the countries in question, e.g. the long-standing "feud" between Britain and France dating back to William's conquest, the Hundred Years' War, the Napoleonic Wars and the Second World War.

[3]Sapienza *et al.* (2013) likewise note that both questionnaires and experimental 'trust games' may capture different things at the same time, i.e. not only trust as a belief about others, but also perceptions about one's own trustworthiness and other confounding preferences. The wording used by Falk *et al.* (2018) in the questionnaire item on trust - "People have only the best intentions" - is trying to limit the room for interpretation by the respondent. But this also limits the context available to him. Other, more specific forms of trust, e.g. trust in politicians or authorities, trust in firms and more, thus need to be distinguished from the measure of the GPS.

captures an inclination to return favors or to engage in forms of *gift exchange* (cf. Akerlof, 1982), whereas negative reciprocity represents a willingness to punish others for perceived wrong-doings and to take revenge, even at the expense of additional own costs.

There is a vast theoretical and empirical literature establishing relationships between these preferences and individual outcomes such as saving, smoking (Sutter *et al.*, 2013), entrepreneurial activity (Kihlstrom and Laffont, 1979), charity (Andreoni, 1989), collective action and cooperation in general (Fehr and Gächter, 2002, Nikiforakis, 2008), as well as national development (Dohmen *et al.*, 2016), to only name a few. These relationships are also confirmed and supported by Falk *et al.* (2018) for the GPS. While the majority of variation occurs on individual and within-country levels, substantial and marked differences between countries' national average preferences exist. This heterogeneity persists into the influence factors like age, gender and cognitive ability have on the formation of preferences. At the aggregate level, using their new data set at hand, Falk et al. find and support previously observed relationships of geography, language and religion on a country's preference profile. These, in turn, are linked to various aggregate outcomes such as entrepreneurial activity, armed conflicts and even economic development, i.e. GDP. These results - and limitations of previous studies to individual outcomes - provide the impetus of linking aggregate preferences to corresponding outcomes, i.e. trade.

In doing so, our results add on one hand to the trade literature on non-tariff barriers as well as to the behavioral literature on preferences' importance for aggregate outcomes. We find distinct relationships between the national preference tendencies and the composition, volume and number of trade flows and relationships. These exist at both the unilateral - or national - and bilateral level. Hence, we propose and argue for the observed set of preferences as a potential channel - or bridge - leading from intangible cultural factors and distances towards the economic outcome of trade, combining these two main strands of literature. Non-tariff barriers like culture and history have become more important recently as globalization has slowed down well below the intensity predicted by conventional drivers such as size and transportation costs. Originating from "missing trade" (Trefler, 1995) and "dark" trade costs (Head and Mayer, 2013) and evolving over colonial history and language commonality, attention has shifted towards intangible factors like values, cultural aspects which are themselves related to preferences.

Examples for this branch of literature include Melitz and Toubal (2014) who refine and extend on the standard simple common official language effect and reveal a channel of shared ethnicity and trust in addition to facilitated communication with measures of shared native and spoken languages. This was expanded upon by Lameli *et al.* (2015), who discovers a significant trade-boosting effect between German regions sharing similar dialects, corroborating the existence of an important cultural component within language beyond communication and institutions. Felbermayr and Toubal (2010) build another proxy for cultural proximity and find a positive effect on trade between European countries. Similarly, the genetic distance measure

established by Spolaore and Wacziarg (2009) is used by Fensore *et al.* (2017) who propose a negative effect of ancestral distance on trade using trust and values among their explanations. However, Giuliano *et al.* (2013) raises doubts on the exogeneity of genetic distance in this regard, providing evidence that previously unaccounted for geographic characteristics may affect both. Frank (2018) considers distances in cultural attitudes on future orientation, gender egalitarianism and more from the GLOBE survey, a survey performed exclusively on managers, and finds significant effects on trade for some of the nine observed cultural dimensions, but ambiguous trends over time. Using data from the World Values Survey, Jaeggi *et al.* (2018) construct a *Dyadic Value Distance* measure and find effects on overall economic development.

Our own analysis expands on these results by positioning the preferences as a potential intermediary and a more direct influence than culture: Preferences affect attitudes, goals and calculations during bilateral negotiations, thus shaping trade outcomes. In addition, we add unilateral layers and mechanisms to the literature which is focused almost exclusively on bilateral impacts of these more or less (in)tangible distance measures.

While the trade literature has rarely been focusing directly on behavioral aspects, we believe that the preferences in our analysis and their relationship to trade outcomes contribute a small, but significant part to observed outcomes and trade theory. We argue that the nature and properties of contracts and arrangements, especially in trade (finance) relationships provide one major channel for our analyzed preferences to affect trade in practice. Even in its most basic, stylized form, any agreement on delivery of a good for a pre-defined payment involves elements of patience (term orientation), risk and trust - particularly in the context of international trade. Shipments of goods and realization of profits for firms involved in international transactions requires a substantial amount of time. As an example, average ocean shipping times to the U.S. usually range from 10 up to 50 days (cf. Hummels and Schaur, 2013). One - or both sides - of the transactions will have to bear or deal with the risk of a missed payment after having sent out goods or — in the case of payment-in-advance — receiving goods of inadequate quality or quantity. Frictions in information procurement and contract enforcement also become a lot more pronounced over distance and in often different jurisdictions.

Allocation and alleviation of these risks (and liquidity costs) are an essential part trade transactions, usually dealt with by forms of *trade finance*(Ahn, 2011). While the exact numbers vary by country, time and industry, the vast majority is made up by the contract forms of Open Account, Cash in Advance and bank-intermediated payments such as a Letter of Credit (Antras and Foley, 2015, Schmidt-Eisenlohr, 2013). While these methods can redistribute or diversify these risks, they do remain for either the exporter or importer - though conventional wisdom places it on the former; as do our results. Subsequently, risk attitude should matter as well. Recent work, for example by Kukharskyy (2016) or Defever *et al.* (2016), extends the standard static incomplete contracts framework by Antras (2003) with a repeated

interaction setting and applies the concept of relational contracts à la Baker *et al.* (2002) to the trade context. They show that only sufficiently patient firms are able to establish efficient trust-based supplier collaborations, even when facing weak institutions and contract enforcement. Earlier work by McLaren (1999) already highlighted a prevalence of informal contracts in some regions and points towards its potential benefits in secondary cooperation and cost-sharing. Araujo *et al.* (2016) and Aeberhardt *et al.* (2014) stress the importance of trust in a dynamic sense, i.e. a kind of pair-specific reputation, in similar settings and show that trade volumes with a specific partner are only increased subsequently over time. Similarly, Rauch and Watson (2003) and Besedeš (2008) show that many firms engage in small test orders first when they deal with new partners. These inclusions of repeated interactions and matters of enforcement also stress potential channels across which perceptions of reciprocity may influence outcomes.

Using the GPS' significant between-country variation and its unique scope, we can examine the preferences' effects on trade outcomes more closely within a gravity framework. This is both relevant - for trade is the aggregate outcome of human negotiation - and practical - as both are observed on the national level. Using a typical gravity framework, the preferences can be considered as both bilateral non-tariff trade costs and as a unilateral component of a country's inclination and barriers to trade, the multilateral resistance term. The bilateral distance is constructed as the difference between a nation pair's preferences, while the unilateral impact is analyzed in a second stage on country-specific fixed effects used in the gravity analysis. Trade is observed both on the intensive (volumes) and extensive (number of traded goods categories) margin, with a wide variety of economic and cultural indicators used as controls.

Previewing our results, higher risk aversion and patience increase exports of differentiated goods, whilst lowering those of non-differentiated goods. This suggests that term and risk transformation processes are affecting negotiations and interactions with outside partners. That is, exporters specialize over their time horizons and willingness to incur risks, gaining comparative advantage in the corresponding products.

Bilaterally, distances in negative reciprocity adversely impact trade. This effect is robust across all goods categories and specifications. It likely stems from mismatches in contractual expectations and the uncertainties and risks associated with a negatively reciprocal partner and his willingness to punish if perceiving himself slighted. Distances in patience decrease trade volume in differentiated goods, but have no impact on non-differentiated goods. They do, however, raise the extensive goods margin and impact volume positively within an OECD subset. These results support arguments of term transformation, but suggest limitations to this channel, such as a required minimum patience and other certain preconditions. In general, the extensive goods margin produces results that contrast the intensive one: distances in positive reciprocity and risk have negative effects on the number of traded goods categories, whereas that of a distance in patience becomes positive. Negative

reciprocity has no effect here. Overall, our effects hint at specific, previously less focused on motivations for trade. The economic preferences present incentives and factors to judgement in contract negotiations, repeated interactions, specialization, and diversification strategies beyond the simple intangible idea of cultural distance and proximity.
The rest of the paper is structured as follows: after introducing the data and empirical strategy in section 2, we discuss potential channels through which the preference set may affect trade outcomes and some predictions. Results are presented in section 4, followed by a set of robustness checks. We end with some concluding remarks.

2.2 Data & Empirical Strategy

Mapping and isolating the potential impact of preferences on trade requires a comprehensive, three-part data set consisting of the GPS' preference data, the corresponding trade data and a set of cultural and institutional controls. The following subsections will be dedicated to describing the data used and the baseline models.

2.2.1 Data

Preference Data The main variables of interest are the GPS' results detailing a six-dimensional preference structure for 76 countries: patience, risktaking, positive and negative reciprocity, trust and altruism. Patience is therein understood as a broader measure of term orientation or time discount considerations, whereas risk assesses the average risk premium of a given population. Positive reciprocity is the willingness to reward cooperative behaviour and, consequently, negative reciprocity the willingness to conduct costly punishment of non-cooperative or deviant behaviour. Altruim is defined as the willingness to contribute to good causes or give to others, while trust is defined - more broadly - as the belief in other people's good intentions. All preferences are considered to be persistent, underlying convictions or notions, related to upbringing, education, norms and other societal trends.
The GPS was conducted alongside the 2012 Gallup World Poll, utilising the infrastructure and scope of that survey to gain both coverage and size. The Gallup World Poll interviewed representative samples of at least 1,000 persons per covered country and uses tried weighting techniques for these samples to match a nation's population. The GPS' data covers all important global economies with the possible exception of Africa, as shown in Figure 2.1. Around ninety percent of world population and GDP lie within the sample borders. Africa's coverage is less dense than for the other continents, but both Sub-Saharan and North African are included, which permits their use without disregarding the structural differences imposed by the Sahara desert (see Falk *et al.*, 2018). This scope permits conclusions beyond the traditionally available data from more developed countries only. This size and the World Poll's methodology elevate the GPS above previously available measures.
Additionally, the survey items - except for negative reciprocity and trust - are ex-

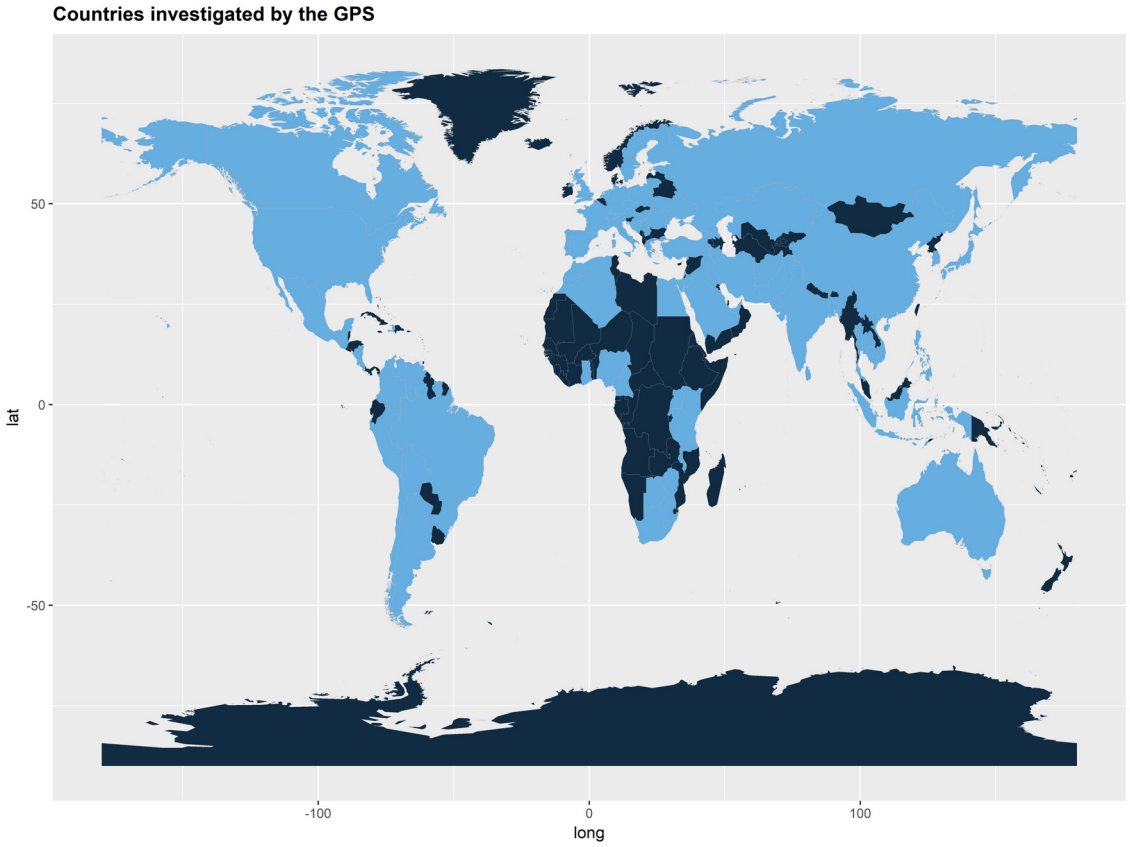

Figure 2.1: A World map detailing the countries covered by the GPS in blue.

perimentally validated (see Falk *et al.*, 2018), in that incentivized experiments were conducted to evaluate the fit between survey answers and revealed preferences in the experiment. This factor differentiates the GPS from other, typically questionnaire-only surveys of similar intent by contextualizing the preferences as economic. The focus is shifted from abstract cultural measures and perceptions to a role in decision-making. Via that channel, they shape desired outcomes and goals - e.g. patience and risk - as well as defining behaviour in interactions - e.g. reciprocity and trust - , the GPS preferences inform negotiations. That includes the establishment and management of international trade relations.
As for the preferences themselves, they are provided in a normalized distribution, calculated in a three-step procedure. First, individual-level data on the experimental and survey data is combined using weights obtained by OLS regression on behavior observed in the experimental validation study conducted beforehand (see Falk *et al.*, 2016). Secondly, these measures are standardized with regard to the full sample of around 80,000 individuals from all 76 countries. Hence, each preference is, by design, of mean zero and standard deviation one on individual levels. Third - and lastly -, individual-level data of each country is aggregated to the national average using Gallup World Poll sampling weights. As a result, the national averages are representative of a respective country's population and similarly have means close to zero. Their standard deviations lie between 0.27 and .37, with explicit minima and maxima diverging from symmetry (see Table 2.1 and Figure 2.2). All preferences are positively skewed, except for positive reciprocity which exerts negative skew.

Table 2.1: Descriptive Statistics of the GPS Variables

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Patience	76	−0.003	0.370	−0.613	−0.258	0.132	1.071
Risktaking	76	0.013	0.302	−0.792	−0.157	0.163	0.971
Pos. Reciprocity	76	−0.034	0.342	−1.038	−0.242	0.187	0.570
Neg. Reciprocity	76	0.013	0.275	−0.489	−0.168	0.183	0.739
Altruism	76	−0.038	0.343	−0.940	−0.240	0.154	0.906
Trust	76	−0.022	0.278	−0.706	−0.177	0.153	0.609

Notes: Each of the preferences is normalized on the individual level, then aggregated to national averages using Gallup World Poll weights. Hence, their means are close to but not exactly zero. Standard deviations range from 0.275 to 0.37, as substantial variation occurs between individuals and within nations. Minima and maxima highlight an asymmetry in preference distributions.

Culture, Politics and Institutions Preferences might be correlated with other cultural variables. They could also interact with institutional settings, as has been found for trust and rule of law (Yu *et al.*, 2015), or the overall economic situation. To account for these potential biases, a broad range of cultural, historic, political

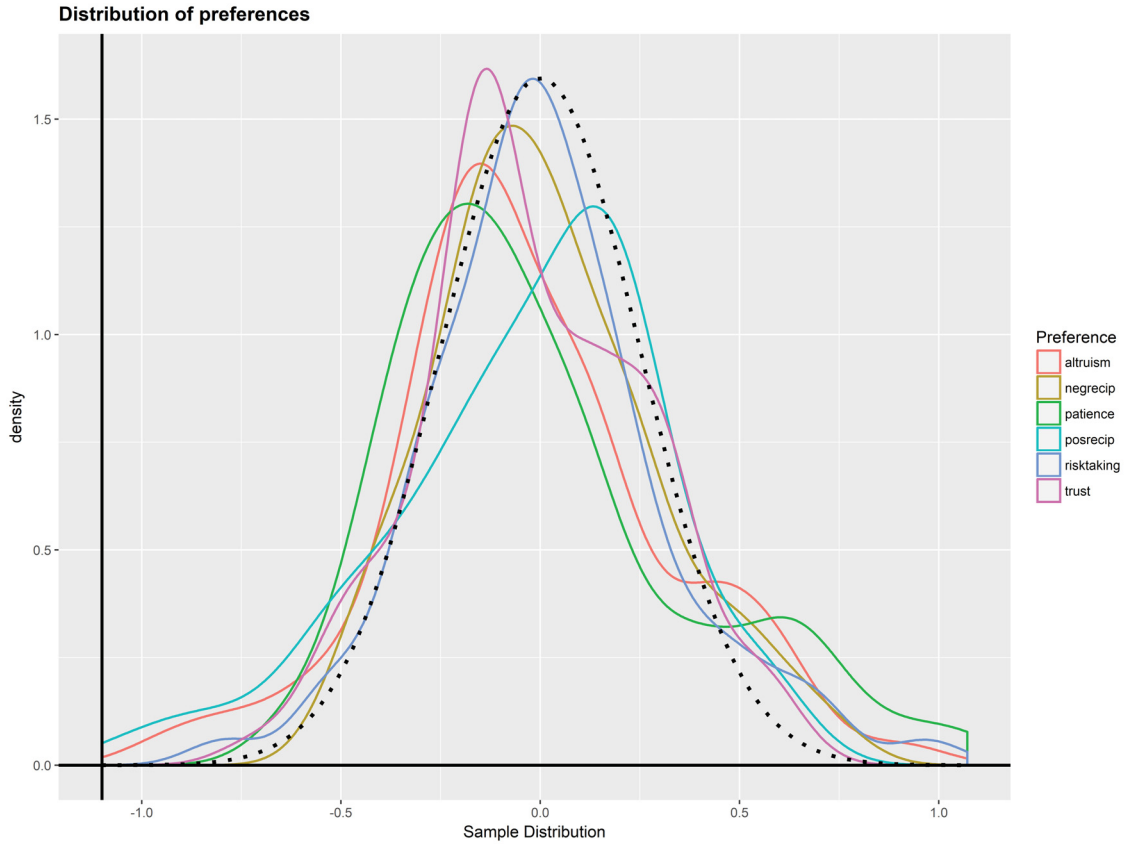

Figure 2.2: Distribution of national preferences. The density functions of all preferences are plotted against a normal distribution with mean zero and a standard deviation of 0.25 (dotted black line). All distributions exhibit positive skew, except for the negatively skewed positive reciprocity. They are also substantially less dispersed than the normal distribution, as the comparison shows. Risk attitude diverges least from the plotted normal distribution, though it is still not normally distributed.

or economic indicators supplements the preference data. This includes population, GDP and other national characteristics from the CEPII (Head and Mayer, 2014, Head *et al.*, 2010) as well as information on geography and colonial history (Mayer and Zignago, 2011). Additional data on country terrain is drawn from Nunn and Puga (2012), who measure the ruggedness - i.e. differences in altitude - within a country, a potential measure for physical trade barriers[4]. Information on regional trade agreements is extracted from Egger and Larch (2008).
Data on linguistic similarities is integrated using data from Melitz and Toubal (2014), who provide and compare multiple measurements for the resulting ease of communication. In the same vein, information regarding cultural, religious and genetic distance from Spolaore and Wacziarg (2016, 2018) is used to account for the more general effects of alien- or likeness. The Dyadic Values Distance measure created by Jaeggi *et al.* (2018) and drawn from the World Values Survey is included for contrast and comparison; as are the Hofstede dimensions (see Hofstede *et al.*, 2010). For political and institutional influences, the Polity scores (2018), Freedom House indices (2018), and Worldwide Governance Indicators (Kaufmann *et al.*, 2009) are used. These assess democratic or autocratic leanings and civil liberties as well as issues of politic representation, respectively. Thus, the measures can be used as proxies for legal rights and personal freedom, which might both impact negotiation behavior and outcomes.

Trade Data The trade data used in the analysis is obtained from UN Comtrade for 2012, the year in which the GPS had been conducted, at the 3-digit industry level (SITC, Rev. 4). Flows are measured using import data, which is considered more accurate due to customs and tariff requirements of the receiving country. All 240 goods categories are observed for 68 countries of the GPS. The disaggregated data is used to divide trade flows into listed, reference priced and differentiated goods according to Rauch (1999), as these groups might respond differently.
A subset of ten nations available in the GPS - Afghanistan, Botswana, Cameroon, Haiti, Iran, Iraq, Kenya, Morocco, Philippines and Venezuela -, have not yet reported for 2012. Their flows are calculated using export data from their 66 partner countries[5]. Additionally, Bosnia-Herzegovina and Serbia are dropped due to the risk of confounding with Yugoslavia for several cultural variables, while Afghanistan is dropped due to a general lack in controls.
Given these corrections, the final dataset contains 73 countries from all continents, yielding 5256 exporter-importer pairs and 1,261,440 bilateral good-specific trade flows. Of these, 35.8 percent are non-zero, whereas the average value of a bilateral

[4]However, these measures were excluded from the final results to consolidate variables used in the second stage on account of the low number of observations. Since their exclusion does not alter results significantly, this seemed an acceptable compromise. Nonetheless, their potential influence had to be controlled for.

[5]See subsection B.1 for further detail regarding potential bias inherent in the use of reported data from both trade flows. Note also that trade between these countries is missing entirely, causing potentially non-negligible bias.

good-specific trade flow amounts to 8.9 million US-Dollar. The average country trades with 67 out of 72 potential partners and in 86 out of 240 goods categories.

2.2.2 The Model

The analysis is built upon the Gravity framework by Anderson and van Wincoop (2003) and its expansions by Head and Mayer (2014), Yotov *et al.* (2016) and Santos Silva et al. (2006, 2014). Therein, international trade x_{ij}, between exporter $i = 1, ..., I$ and importer $j = 1, ..., J$, is modeled as:

$$x_{ij} = \underbrace{\frac{Y_i}{\Omega_i}}_{S_i} \underbrace{\frac{X_j}{\Phi_j}}_{M_j} \phi_{ij} \tag{1}$$

Y_i and X_j are the total values of exporter production and importer expenditure, respectively, and ϕ_{ij} describes the bilateral trade costs between i and j, which are assumed to be symmetric. Ω_i and Φ_j represent the multilateral resistance terms, a representation of the average trade barriers faced by exporters. These terms can be defined as:

$$\Omega_i = \sum_l \frac{\phi_{il} X_l}{\Phi_l} \quad \text{and} \quad \Phi_j = \sum_l \frac{\phi_{lj} Y_l}{\Omega_l} \tag{2}$$

Ω_i is the expression of an exporter i's average cost of exporting to any other country, and Φ_j correspondingly the average cost of importing into country j.[6] An alternative designation is that of outward and inward multilateral resistance term, respectively (see Donaubauer *et al.*, 2018). With the Gravity framework's three cost parameters, ϕ_{ij}, Ω_i and Φ_i, the potential effects of GPS preferences can be studied. Differences between them might impact bilateral trade costs through negotiations, similar in design to cultural distance. Such divergence would then lower trade, though the opposite effect is conceivable as well. However, the preference leanings of a population - i.e. their outlook - might also impact the openness to trade.

Intensive Margin Both multilateral resistance terms are typically modelled as fixed effects, S_i and M_j (see Equation 1), due to computational and information restrictions. This method also accounts for unobserved heterogeneity in trade determinants. A country's preferences would be swallowed up by the fixed effects given their assumed persistence. However, these fixed effects and its components can be analyzed in a two-step approach using a Gravity specification first and OLS on the estimated fixed effects (cf. Donaubauer *et al.*, 2018, Head and Mayer, 2014) second. In accordance with the wider literature, that specification is estimated using Pseudo Poisson Maximum Likelihood (PPML), which is both consistent in the presence of

[6] More precisely, the average trade barrier of one exporter (importer) is constructed as the sum of bilateral trade costs weighted by the expenditure (consumption) share of each flow and the respective partner's own average import (export) costs. In its pure form, this could only be solved iteratively or given a complete set of trade costs.

heteroskedasticity and allows the inclusion of zero trade flows (Santos Silva and Tenreyro, 2006). The first step estimator is defined as:

$$x_{ij} = exp\left(|\boldsymbol{z_i} - \boldsymbol{z_j}|\,\boldsymbol{\beta} + S_i + M_j + \boldsymbol{\phi'_{ij}\gamma}\right) + \epsilon_{ij}, \tag{3}$$

where S_i and M_j are the exporter and importer fixed effects - or average trade barriers - and $\boldsymbol{\phi_{ij}}$ is a vector of bilateral (dyadic) trade cost variables. x_{ij} is the volume of exports from country i to country j, the intensive margin of trade. $|\boldsymbol{z_i} - \boldsymbol{z_j}|$ is a measure for preference distances between a country pair. Each of the six preferences - patience, risk, positive and negative reciprocity, trust and altruism - is included separately. As the GPS variables are normalized, the normal difference would be impossible to estimate, necessitating the absolute one. This approach is also reasonable as the direction of the preference distance should be secondary compared to the distance itself.
The gravity equations are applied to both the total bilateral trade volumes and separate volumes for differentiated and non-differentiated goods. This split accounts for the fact that negotiations - through which preferences are most likely to impact trade outcomes - would play a more important role for differentiated goods than for listed or reference-priced commodities. The more goods diverge from a global standard, the more details need to be covered in the bilateral negotiations and the less can be relied on that standard to assure an effective contract. This split is achieved using the Rauch (1999) classifications for three-digit SITC 4 commodity classes, yielding 240 separate potential bilateral flows per country pair, which are then aggregated into two export volumes for each of the groups.

In the second step, the estimated exporter and importer fixed effects are each regressed on their respective preference measures $\boldsymbol{z_i}$ and country-specific variables $\boldsymbol{C_i}$ such as GDP per capita, population and internal distance:

$$S_i = \alpha_0 + \alpha_1\overline{\phi_i} + \boldsymbol{C'_i\delta} + \boldsymbol{z'_i\eta} + v_i \;\; and \;\; M_i = \alpha_0 + \alpha_1\overline{\phi_i} + \boldsymbol{C'_i\delta} + \boldsymbol{z'_i\eta} + v_i, \tag{4}$$

where $\overline{\phi_i}$ is the weighted average over the dyadic characteristics of each country $\overline{\phi_i} = \sum_j \boldsymbol{\phi'_{ij}}\hat{\boldsymbol{\gamma}}$.[7]

Extensive Margin So far, the impact of preferences has been modeled as one of repeated interactions within existing commercial relationships, that is: the intensive margin, the volume of non-zero trade flows. Yet negotiations and other communication also take place during the inception of trade, that is: the change from a zero flow to a non-zero one - the extensive margin. While it is impossible to gain a measure for that exact moment in time when a first contract for a country pair

[7]The estimated coefficients for ϕ are chosen as weights, given their implicit information on a variable's significance. This approach also corresponds to Donaubauer *et al.* (2018)

and specific good is formed, an average over these events can be approximated via measures for the number of traded goods categories. This limitation conveniently matches the GPS' own of being representative only on the country-level. Contextually, it allows insight into how the composition of trade - i.e. whether a bilateral relationship is diversified over several goods classes or restricted to only a few - is affected by preferences or their bilateral distances.
For these purposes - and to retain coherence with the intensive margin estimates -, the extensive margin is defined as a count variable of bilateral non-zero trade flows on the three-digit SITC industry level c: $T_{ij} = \sum_c t_{cij}$, with: $t_{cij} = 1$, if: $X_{cij} > 0$.[8] T_{ij} thus has a lower bound of zero and an upper bound of 240, the amount of three-digit industry classifications. As with its intensive margin counterpart, the extensive goods margin is estimated on the aggregate level and for differentiated and non-differentiated goods classes separately. In all cases, PPML is used in specifications otherwise identical to those for the intensive margin: [9]

$$T_{ij} = exp\left(|\boldsymbol{z_i} - \boldsymbol{z_j}|\,\boldsymbol{\beta} + S_i + M_j + \boldsymbol{\phi'_{ij}\gamma}\right) + \epsilon_{ij} \tag{5}$$

2.3 Hypotheses

The analysis by Falk *et al.* (2018) and others before has shown that differences in preferences can not only lead to substantial variance in personal decisions, but also in aggregate outcomes of major importance such as a country's GDP. In this paper, we want to analyze trade as both a potential conductor and even magnifier on the way from individual decisions to economic outcomes and development. Trade (and trading firms) make up a large share of world's production and consumption and its interrelation with growth is widely acknowledged (Bernhofen and Brown, 2005, Donaldson, 2015, Frankel and Romer, 1999).
The preferences measured in the GPS are reflective of factors informing players' calculations in negotiations and related settings. Even though not all effects postulated here may be substantial enough to manifest at the overall aggregate level, we believe that they do play an important part in influencing trade business decisions in particular. As mentioned above, compared to local transactions, international trade bears a significantly higher level of uncertainty, risk and time. Therefore, the structure and features of a contract are central and its design and the final decision on a contract crucially relate to our observed set of preferences.

[8] Using the industry-specific binomial variables t_{cij}, a logit estimation of the bilateral decision to trade in one specific goods class becomes possible. That model can be defined as:

$$t_{cij} = exp\left(|\boldsymbol{z_i} - \boldsymbol{z_j}|\,\boldsymbol{\beta} + S_i + M_j + \boldsymbol{\phi'_{ij}\gamma} + \boldsymbol{\theta_c}\right) + \epsilon_{ij}$$

, and is estimated for robustness purposes (see Table B.10). As this binary model suffers from incidental parameter bias, its results are not sufficiently reliable to serve as a primary result.

[9] Note that the count variable definition used in the *breadth of trade* extensive margin estimates is closer to an actual Poisson model than the volume speficiation.

As a simple guiding structure, we consider a Home firm looking for a supplier [10]. Its outside option is to immediately buy from a local supplier H with guaranteed quality and quantity x_H, thus allowing a safe final payout y_H and profit π_H:

$$\pi_H = y_H - c_H x_H \tag{6}$$

International profits take the following form:

$$\pi_T = -c_T x_T + \delta[p y_T + (1-p) d y_T] \tag{7}$$

We assume that dealing with an international partner yields a higher potential payout, may it be through lower buying prices, i.e. $c_T < c_H$, better quality or access to a unique variety of a good or input, i.e. $x_T > x_H$, but also $y_T > y_H$. At the same time, this higher payout comes with a delayed realization (valued at discount factor δ) and the risk of default with probability $(1-p)$. The ordered goods may never arrive, or, vice versa, the firm may default on the payment. One may extend this setting with the possibility of a partial payout of share d, applying to situations of deliveries of insufficient quantity or quality, but also to a potential enforcement and recoupment with some probability. The decision on which potential relationships and contracts hold a positive expected value and how eventual repeated interactions play out may then crucially hinge on the set of preferences observed in the GPS.

Patience Patience, which we can simply depict as the discount factor for delayed and future payouts in our contract setting, measures the willingness to forego short-term profits for higher gains in the long-run. Since trade can be understood as a method to achieve efficiency gains by constructing international supply and distribution networks, higher patience should positively impact overall trade intensity and volume. I.e., due to longer delivery times, an often longer search and set-up time, more time needed to enforce contracts and payments if necessary, more patient agents should naturally be more likely to engage in trade than impatient agents, c.p. When we consider potential increasing long-run benefits of successful repeated interactions, these would also be more valued by patient agents and thus tend to increase the prevalence of said long-run relationships and also of successful initial completions in the interest of enabling further cooperation.

Risk-aversion Likewise, less risk-aversion should facilitate the buildup of trade relations because of the specific trade-inherent risks mentioned above. Also, when comparing the setting up of trade facilities and networks to a basic risky investment consideration, any simple investment model would predict more investments, and here: more trade, for less risk-averse agents. However, looking at a broader and more complex picture, a motive of risk minimization may have opposite effects as

[10] Analogously, the same channels can be transformed to different settings, e.g. a Home producer looking to export to a Foreign distributor, or to the viewpoint of the Foreign firm.

well through the strategy of diversification. In the long run, more risk-averse firms may still find it optimal to trade more compared to its local domestic production and to trade with multiple different countries and areas as a means to insure against national or regional shocks. This holds true for both importers, e.g. needing constant access to required inputs, as well as for exporters, wanting to ensure a steady turnover and flow of income.

Trust & altruism As stated above, any trade relationship is vulnerable to a basic time-inconsistency problem due to its non-immediate nature. In this setting and given our measure of *trust*, we can interpret it as an initial perceived risk that the trading partner might not follow through with the agreed payment and/or delivery of goods. Of course, in reality even perfect trust in the trading partner would not rid a trade deal of any risk whatsoever. One would still need to consider exogenous factors such as transport, currency risks and more.
In addition, trust and as well *altruism*, both imply a positive attitude towards negotiating partners and humans in general. This increase in positive beliefs and goodwill should reduce the barriers to reach an agreement and heighten those for breaking or ending one. Altruism is measured as a willingness to donate and to give to good causes here. At an even more general level, we can think of altruism as caring about others' payoffs independently of one's own payoff. We can apply this to the above contract setting in a basic manner by simply incorporating some part of the trading counterpart's payoff into an agent's own utility. It is straightforward to see that this would push some contract opportunities at the margin to a positive decision that would have been deemed, for example, slightly too risky otherwise. While this might arguably not be too prevalent in real-world everyday business decisions, agents and countries with higher levels of altruism should therefore also tend to trade more. However, in contrast to risk attitude and patience, it is unclear how these national preferences relate to trade outcomes when the partner in question leans towards the other extreme. That mismatch could then be harmful for trade - thus necessitating an approach estimating the impact of differences in preference leanings.

Positive reciprocity Positive and negative reciprocity can also be viewed as stabilizing factors in commercial agreements. The general importance of reciprocal behavior, especially in non-enforceable contracts, has been established by Fehr *et al.* (1997) and others. Akin to a standard gift exchange (cf. Akerlof, 1982), we may view actions such as reliable and timely payments and the production of high-quality goods as a form of "gifts". In a more general context, positive reciprocity has been shown to increase cooperation by also inducing selfish types to cooperate (Gächter and Herrmann, 2009). Cable and Shane (1997) propose a key role of positively reciprocal cooperation for entrepreneurs in acquiring capital and developing alliances with bigger companies. Positive reciprocity should therefore tend to generally foster trade relationships. Additionally, a successful and positive trade deal in a first pe-

riod can be further rewarded on both sides through subsequent dealings in following periods. While positive reciprocity extends beyond measures of trust, it captures an approach to negotiations that could build bilateral trust. Agents of a country with higher levels of positive reciprocity would invest more - and act more gratefully - into a relationship with a partner who has shown to be trustworthy and reliable, or shown similar levels in positive reciprocity.

Negative reciprocity Meanwhile, the effect of negative reciprocity is less straightforward. On one hand, higher levels imply a willingness to punish deviation from contracts and agreements - even beyond a level where it would be monetarily rational to do so -, thus raising the cost of a breach of contract once it has been established. While this might partially deter some initial agreements in the first place, the prospect of a more credible strong punishment could help to prevent deviation and therefore foster the build-up of longer-term and growing relationships. For example, Dohmen *et al.* (2008) highlight this ability to make credible threats as a potential bargaining advantage. However, this seems to only hold true for milder forms of negative reciprocity. In its strongest forms of decisively taking revenge and anti-social punishment, negative reciprocity may actually hinder coordination and cooperation (Gächter and Herrmann, 2009, Herrmann *et al.*, 2008). Caliendo *et al.* (2012) also find that a propensity to take revenge has a negative effect on the probability to stay in entrepreneurship, suggesting that high levels of negative reciprocity reflect non-cooperation and reduce one's own profits. The net effect on trade is unclear ex ante, but between-country differences in particular may drive a wedge between the trading partners' contract expectations and thus tend to hinder trade agreements.

Bilateral differences Following the literature on shared characteristics in trade such as language, ethnicity and culture, we also analyze a potential boosting effect of overall preference similarities between two countries, in as they might ease contractual agreements and communication. However, a simple affinity to similar people alone would predict increased trade both between, e.g. two highly risk-averse countries as well as between two risk-neutral countries. On the other hand, a contrast in certain preference dimensions might actually also help to enable trade. For example, a particularly risk-averse exporter would naturally find it easier to agree on a contract with a risk-neutral importer readily willing to pay in advance, all other things being equal.
In fact, some agents might find it profitable to actually seek out trading partners of opposing attitudes, thus providing a channel of potential trade boost effects that go beyond simple unilateral level effects. Time and risk premia that impatient and risk-averse (and in combination with that, also less trusting) agents would be willing to pay can be exploited by agents willing to contractually provide the desired time and risk transformations because they are more patient and risk-tolerant themselves. By increasing the likelihood of finding such a respective trading partner there, in-

teractions and trade flows between two diverging countries should tend to increase on average, e.g. a patient firm is more likely to find a partner willing to pay a time premium in countries that are on average more impatient.
In the following, we thus explore potential effects of bilateral differences and similarities as well as unilateral country-specific effects in a two-step gravity approach.

2.4 Results

2.4.1 Standard Gravity

The results from estimating the intensive margin of trade via PPML are reported in Table 2.2. Specification (1) is a conventional gravity equation regressing bilateral exports on distance[11], contiguity, colonial relationships, existing regional trade agreements, sharing a common language and country fixed effects. With one exception, the coefficients have the expected directions and are significant at the one percent level. Common language *lng*, however, is insignificant, which does not change when using native and spoken language dummies. This observation is in line with Melitz and Toubal (2014), who likewise find insignificant language effects when using PPML estimators[12] and whose dummies are used in this analysis.
Specification (2) incorporates a *bilateral distance in preferences* measure similar to Jaeggi *et al.* (2018) or Spolaore and Wacziarg (2018). This variable is defined as the unweighted average of the l single preference distances: $\text{dpref} = \frac{1}{l}\sum_k^l(|\boldsymbol{z_{ki}} - \boldsymbol{z_{kj}})|$; and thus measures whether preferences affect outcomes simply by being different, which would speak for the overall preferences reflecting or proxying for a simple cultural (dis-)similarity. Such an outcome is not observed. Moreover, results for the conventional gravity parameters are barely altered by its inclusion, implying little correlation between these variables and the preferences - given fixed effects.
Inclusion of the single preference bilateral distance measures in specification (4) likewise barely affects the conventional variables, though the colony coefficient increases slightly. Of the preference distances, only that for distance in negative reciprocity *dnegrec* is significantly different from zero. If it were to increase by one standard deviation (0.236)[13] - e.g. the distance between Czechia and Lithuania -, the respective trade volume would decrease by 14.87%. These effects are not driven by level effects, i.e. a high distance being relevant on account of the high level of one partner - an issue for measures of legal quality[14]. As mentioned above, negative reciprocity

[11]The measure is constructed by taking the natural logarithm of the average distance in kilometres between the most important population centre's of the two countries as calculated in Mayer and Zignago (2011).

[12]Overlap with the colonial relationship dummy may partially explain these results, as both are relatively broad measures for many-faceted conditions and durations of national exposure.

[13]Summary statistics for the preference distances are listed in Table B.1 of the Appendix.

[14]See subsection 2.4.3 for the investigation of level effects and, for example, Yu *et al.* (2015) for the discussion with regards to legal quality

Table 2.2: Estimation of Aggregated Bilateral Exports

	Basic Grav.	Agg. Pref. Dist.	Agg. Pref. Dist	Single Pref. Dist.	Single Pref. Dist.
	(1)	(2)	(3)	(4)	(5)
ldist	-0.60^{***}	-0.60^{***}	-0.59^{***}	-0.60^{***}	-0.59^{***}
	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)
contig	0.42^{**}	0.43^{**}	0.48^{***}	0.44^{**}	0.49^{***}
	(0.15)	(0.15)	(0.14)	(0.14)	(0.14)
colony	0.29^{**}	0.29^{**}	0.31^{**}	0.32^{**}	0.34^{***}
	(0.11)	(0.11)	(0.10)	(0.10)	(0.09)
rta	0.28^{**}	0.27^{*}	0.32^{**}	0.27^{**}	0.34^{***}
	(0.10)	(0.11)	(0.10)	(0.10)	(0.09)
lng	0.05	0.04	-0.07	0.03	-0.07
	(0.15)	(0.15)	(0.12)	(0.14)	(0.13)
dpref		-0.20	-0.31		
		(0.40)	(0.35)		
comleg			0.18^{*}		0.16^{*}
			(0.07)		(0.07)
leg.qlt			0.14^{***}		0.15^{***}
			(0.02)		(0.03)
dpati				0.04	-0.15
				(0.12)	(0.10)
drisk				0.36	$0.50^{\cdot}$
				(0.25)	(0.26)
dposrec				0.09	-0.01
				(0.21)	(0.21)
dnegrec				-0.63^{***}	-0.53^{***}
				(0.15)	(0.16)
daltr				-0.17	-0.09
				(0.11)	(0.11)
dtrus				0.05	0.09
				(0.19)	(0.18)
Observations	5112.00	5112.00	5112.00	5112.00	5112.00
Deviance	4784986994227.90	4781335510276.27	4653839002672.03	4671230483219.89	4556478256897.52
Exp./Imp. FE	YES	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The estimation on aggregated bilateral exports, X_{ij}, is conducted via PPML. The variables of interest are the distances in preferences, included as an unweighted average *dpref* in (2,3) and as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (4,5). A dummy for common legal systems *comleg* and a measure for differences in legal quality *leg.qlt* are included in models (3) and (5) due to their potential impact on negotiations, the channel of interest. Model (1) is a standard gravity equation for comparison. Standard errors are clustered to Importer and Exporter fixed effects.

may ex ante have adverse or positive effects in cooperations and thus relations, depending on which of its forms dominates. Negative reciprocity is understood as a willingness to commit costly punishment against a non-cooperating player, but may devolve into actions of revenge[15]. Being able to credibly commit to punishments could foster and stabilize contracts, but high levels of negative reciprocity would raise the risks of a contract for a given partner, potentially deterring them. Additionally, once a punishment has been committed within a relationship, it might end it for good - either by a "grim trigger"-like strategy of the negatively reciprocal player or by the negative signal of the punishment on his partner.
A distance in negative reciprocity attitudes can also translate to differing approaches regarding breach of contract and enforcement measures. Either party of such a distant would lack understanding for proposed measures, perceiving them instead as unfair or threatening. This is in line with behavioral literature stressing the crucial role of expectations, (perceived) intentions and concepts of "fairness" with regards to reciprocity and cooperation (e.g. Bosse *et al.*, 2009, Falk and Fischbacher, 2006, Fehr and Gächter, 2002). Dynamic aspects in this regard may impede formation of long-running and growing partnerships further. This again lends itself to the "grim trigger" punishment interpretation, i.e. ending all future business dealings in response to even minor contract deviations and against monetary rationality. Another possibility are spill-over effects, in the sense that overly harsh punishment - e.g. not engaging in potentially profitable deals - is often also observed in third parties (cf. Fehr and Gächter, 2002). In the trade setting, this would translate to a failed deal between firms A and B resulting in a firm C also refraining from business with firm B or even other firms from B's country.
Given these channels, negative reciprocity could also be related to non-performing legal systems (cf. Herrmann *et al.*, 2008), which might cause individuals to substitute legal intervention with private enforcement. A measure for distance in legal system quality[16] *leg.qlt* is added in specifications (3) and (5) to control for that possibility. Were such a link to exist, results might be biased by adverse effects of weaker legal systems on commerce. This seems not to be the case, as the coefficient of *dnegrec* changes only slightly as in these specifications. Regardless, both the rule of law indicator and the common legal system dummy are significant and possess positive effects, which is in line with previous literature[17]. In addition, the distance in risk becomes significant at the ten percent level[18] when controlling for

[15]In line with behavioral and managerial literature, it would have been sensible to distinguish between the forms of negative reciprocity, which have been queried by sub-questions in the GPS data. Unfortunately, that data is not being provided in the publicly available data set.

[16]That measure is drawn from the Worldwide Governance Indicator *rule of law* (in levels) using absolute differences, as with the preferences.

[17]The directions and significance match the analysis by Yu *et al.* (2015), who also use WGI data as a bilateral variable. More generally, the positive effect of a difference in legal quality likely stems from the presence of one strong legal system in a bilateral setting compared to two weak ones.

[18]More precisely, its significance is on the 5.2% level.

legal systems with an effect comparable in size to that of negative reciprocity, but positive. This corresponds to a diversification or risk transformation argument, in that more risk-averse countries would outsource riskier enterprises, preferring to import their produce - and vice versa. This particular match of a more risk-averse and a risk-tolerant partner may facilitate agreement on the form of trade finance contracts because both partners could agree on allocating risk to the less risk-averse side. Given the significance and robustness issues with this result, it needs to be treated with caution.

2.4.2 Differentiated and Non-Differentiated Goods

Expanding on these results, specification (5) of Table 2.2 is used for an analysis on differentiated and non-differentiated goods, according to the Rauch (1999) specifications on the 3-digit level. That separation yields two sets of comparable trade volumes and allows further disentanglement of the effects. Comparing conventional bilateral variables yields expected and reasonable results: distance matters more for non-differentiated goods, trade agreements matter more for differentiated goods requiring complex regulation. Legal quality continues to matter, though a common legal system appears insignificant for non-differentiated goods. The latter is likely a result of the more formalized exchanges governing non-differentiated goods trade, which reduce the importance of legal recourse.
In general, preferences would be assumed to have stronger effects on differentiated goods, which are more negotiation-intensive and less arbitrated by exchanges or other institutions. That assumption is mostly borne out in specification (2) of Table 2.3: distances in patience *dpati* have a negative impact on trade volumes for differentiated goods, while distances in positive reciprocity *dposrec* have a positive effect, while there is no significant effect for patience in non-differentiated goods. Their coefficients correspond to a 7.3% decrease and a 10.4% increase per standard deviation[19], respectively. The more differentiated a good is, the more likely is its trade within a system of repeated interactions, in which a more positively reciprocal player would reward his partner for cooperation, thus stabilising the relationship. On the other hand, a less patient partner might be unwilling to invest into the high negotiation costs required for such contracts. If the latter interpretation is correct, the negative impact would originate from comparably impatient countries, growing weaker for nations with above-average patience.
Regarding positive reciprocity in the trade of non-differentiated goods, the coefficient becomes negative. An increase in distance would correspond to a 7.45% decrease in trade volumes. In light of the overall results, this sign switch appears as an anomaly. It is likely the result of two separate effects. First, as mentioned previously, repeated interactions matter less for non-differentiated goods. List- and reference-pricing remove the need for more complex negotiations and thus for re-

[19]The standard deviation of *dpati* is 0.331, which equals for example the distance from Estonia to France. For positive reciprocity, it is 0.298 - the distance from France to Italy).

Table 2.3: Estimation of Goods Category-specific Exports

	Differentiated Goods		Non-Differentiated Goods	
	Agg. Pref. Dist.	Single Pref. Dist.	Agg. Pref. Dist.	Single Pref. Dist.
	(1)	(2)	(3)	(4)
ldist	-0.54^{***}	-0.53^{***}	-0.81^{***}	-0.80^{***}
	(0.07)	(0.07)	(0.07)	(0.07)
contig	0.43^{***}	0.45^{***}	0.40^{*}	0.41^{*}
	(0.11)	(0.10)	(0.17)	(0.17)
colony	0.33^{*}	0.37^{*}	0.43^{***}	0.45^{***}
	(0.14)	(0.14)	(0.10)	(0.10)
rta	0.48^{***}	0.52^{***}	0.27^{*}	0.30^{*}
	(0.09)	(0.10)	(0.12)	(0.12)
lng	0.12	0.07	-0.19	-0.18
	(0.15)	(0.15)	(0.17)	(0.18)
comleg	0.25^{***}	0.23^{***}	$0.14^{\cdot}$	0.12
	(0.07)	(0.07)	(0.08)	(0.08)
leg.qlt	0.16^{***}	0.20^{***}	0.14^{**}	0.16^{*}
	(0.04)	(0.05)	(0.05)	(0.06)
dpref	0.18		0.15	
	(0.39)		(0.46)	
dpati		-0.22^{*}		-0.01
		(0.11)		(0.11)
drisk		0.27		0.36
		(0.26)		(0.30)
dposrec		0.35^{*}		$-0.25^{\cdot}$
		(0.15)		(0.14)
dnegrec		-0.34^{***}		-0.57^{*}
		(0.09)		(0.29)
daltr		-0.02		0.20
		(0.16)		(0.22)
dtrus		0.04		0.37
		(0.13)		(0.39)
Observations	5112.00	5112.00	5112.00	5112.00
Deviance	2191196437134.48	2148251386223.37	2786531148536.13	2743904306395.92
Exp./Imp. FE	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: For this estimation, aggregated bilateral exports are split into differentiated and non-differentiated goods according to Rauch (1999) three-digit SITC classifications. The variables of interest are the distances in preferences, included as an unweighted average *dpref* in (1,2) and as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (3,4). Standard errors are clustered to Importer and Exporter fixed effects.

peated interactions. Displaying positive reciprocity - be it in gifts, accomodation or behaviour - becomes less likely and relevant. For differentiated goods, meanwhile, such a gesture - especially when unexpected from the less reciprocal partner - can help overcome obstacles in the negotiations. The second effect is, consequently, the cultural distance expressed within the preferences - larger distances express a foreignness in view and thought, which might complicate negotiations.
In a similar vein, the impact of distances in negative reciprocity is weaker for differentiated than non-differentiated goods (8 to 13.45% per standard deviation). The effect of a willingness to punish - especially an unexpected one for a less reciprocal partner - remains adverse and negative but likely diminishes with good complexity, as it becomes more difficult to find alternative suppliers (or customers). Here, the worse quality fit of an alternative partner balances the increased expected cost of trading with a more negatively reciprocal partner. Additionally, the expectation of punishment may have stabilising effects on existing contracts.
Notably, the aggregate distance in preferences is insignificant for both types of goods, as in the aggregate. This need not imply an insignificance of preference distances as an expression of a cultural separation, but is likely a result of opposing effects within the preferences and in regards to a values dissonance. In contrast to, for example a values dissonance (see Jaeggi *et al.*, 2018), preference distances can be beneficial to economic exchange as well.

2.4.3 Impact on Average Barriers

In a next step, the fixed effects, i.e. the average trade barriers, are extracted from the single preference specifications (2) and (4) of subsection 2.4.2, Table 2.3, to decompose the effects of GPS preferences on trade outcomes. The effects from the separate sets are used due to the substantial observed differences in coefficients between the goods classes[20]. Exporter and importer fixed effects of the two goods specifications are each regressed on average bilateral characteristics relating to the country in question, population and per-capita GDP, a landlocked dummy and the single preferences in their levels. Population *pop* and per-capita GDP *gdpcap* are significant and have the expected positive signs for importers and exporters alike, while being landlocked has an expected negative effect, signaling the higher transport costs arising from lacking ocean access. Average bilateral characteristics are included for consistency only and cannot be interpreted on their own. The results are shown in Table 2.4.
Preferences only seem to matter for exporters (specifications (1) and (3)), though PPML tends to overstate origin country fixed effects, which might cause the lack of significance for the importer fixed effects. In general, however, search costs and risks associated with international trade are considered to be borne disproportionately

[20]Second stage estimations for the aggregate bilateral volumes are shown in Table B.4 and Table B.5 of subsection B.3. Summarily, the preferences are non-significant for the fixed effects of aggregate bilateral volumes.

Table 2.4: Estimation of Fixed Effects Composition

	Second Stage			
	Differentiated Goods		Non-Differentiated Goods	
	Exporter	Importer	Exporter	Importer
	(1)	(2)	(3)	(4)
(Intercept)	19.30^{***}	-0.79	20.55^{***}	-2.61
	(4.66)	(2.87)	(4.05)	(3.29)
avg.char	-0.35	0.05	-0.39	-0.22
	(1.07)	(0.66)	(0.59)	(0.48)
pop	0.04^{**}	0.03^{***}	0.03^{***}	0.04^{***}
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.43^{*}	0.55^{***}	0.75^{***}	0.55^{***}
	(0.21)	(0.13)	(0.16)	(0.13)
landlocked	-1.41^{*}	-0.92^{*}	-1.31^{*}	-0.92^{*}
	(0.67)	(0.41)	(0.51)	(0.41)
patience	$1.86^{\cdot}$	-0.31	-1.60^{*}	-0.37
	(1.06)	(0.66)	(0.80)	(0.65)
risktaking	-2.25^{*}	0.34	1.96^{**}	-0.00
	(0.90)	(0.56)	(0.68)	(0.55)
posrecip	0.97	0.30	0.26	-0.16
	(1.08)	(0.67)	(0.82)	(0.66)
negrecip	0.64	0.16	-0.20	0.71
	(0.89)	(0.55)	(0.68)	(0.55)
altruism	-0.84	-0.24	-0.50	0.15
	(1.02)	(0.63)	(0.77)	(0.62)
trust	0.46	0.56	0.84	0.24
	(0.91)	(0.56)	(0.69)	(0.56)
R^2	0.57	0.58	0.52	0.61
Adj. R^2	0.50	0.51	0.44	0.55
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach. Exporter and importer fixed effects are extracted from Table 2.3 specifications (2) and (4) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Columns (1) and (2) show country characteristics for differentiated goods and (3) and (4) for non-differentiated goods. Exporter results are displayed first in each case.

by the exporter. For him, preferences would then be more important than for the importer, who is "only" the recipient of request, contract and goods.
Of the preferences, risk-taking is most dominant. The less risk-averse a population is on average[21], the less differentiated goods it exports but the more non-differentiated ones. For patience, the reverse is true: more patient countries export more in differentiated goods and vice versa. Both effects are of similar size, yet risk has a somewhat stronger and more robust effect, whereas patience is significant only on the ten percent level in specification (1). For differentiated goods, a one standard deviation change in risk-taking (0.302, see Table 2.1) would lower the average fixed effect (21.6) by 3.15%. This corresponds to a decrease in exports of approximately equal size and a jump from Brazil's risk attitude to Sweden's. The same change implies an increase of 2.41% for non-differentiated goods. Patience yields the opposite result: a one standard deviation increase (0.370: from Brazil to Vietnam) in the preference increases exports of differentiated goods by 3.18%, but decreases those of non-differentiated ones by 2.41%.[22]
According to these results, higher risk-aversion corresponds to an exporter's product mix heavy on differentiated goods, whereas exporters more willing to incur risks trade more in non-differentiated goods. This corroborates the risk transformation argument for distance in risk since alternative suppliers for differentiated goods are scarcer. A risk-averse exporter would thus reduce his exposure to volatility in trade flows. A less averse player, on the other hand, could benefit from risk premiums offered to him for trading in non-differentiated goods, whose suppliers are more easily switched and substituted. Risk-tolerant exporters of raw products such as Australia, Canada or Saudi-Arabia as well as the highly risk-averse Japan would bear out this interpretation. Russia and Brazil, both rich in resources and risk-averse, on one side and Britain and Denmark, poor in resources, but risk-tolerant, on the other side would serve as anecdotal evidence to alleviate concerns that resource allotment drives the effects.
The coefficients for patience align with their underlying long-term considerations or discount factor arguments. Differentiated goods require more up-front investment to produce or trade and involve more complex searches and negotiations with potential partners. Both requires a longer time horizon for the players in question, while non-differentiated goods remove the necessity for search and negotiations by accessing organized exchanges. Additionally, different patience levels allow term transformation, i.e. firms specializing on products maximizing profits for their country's particular time horizons. These foci would differ between nations, netting efficiency and allocation gains from trade - subsequently reinforcing these specializations and thus causing the link observed for the average barriers. Capital allotment - based

[21]The variables are normalized to the global average in the GPS data. That mean is risk-averse, not risk-neutral.

[22]Given these opposing effects for the two commodity class subsets, it is unsurprising that the preferences have no significant impact on the fixed effects of total bilateral flows, as seen in subsection B.3

on discount factors - and contract enforcement would seem reasonable channels for these specialization procedures[23]. As illustrated by Nunn (2007), better enforcement implies more trade in goods which are intensive in relationship-specific investments. Patience, as long-term orientation, would be conducive to considering gains from repeated interactions and more elaborate trade networks. The costs for contract enforcement and its design would then become bearable given the expected future gains from engaging in the effort.
However, while these are potential effect channels, causality cannot be inferred from the available information. Higher patience could also result from a previous trend resulting in a wealthier nation and a more competent enforcement regime. The specialization channels above should also be visible in the first stage since differently patient nations should have diverging specialization and thus incentive to trade. Instead, the coefficient is non-significant or negative. While this might be caused by countries with patience levels too low for mutually beneficial trade, it nonetheless stresses the limits of the patience preference, which is strongly related to measures of national wealth (Dohmen *et al.*, 2016).[24]

2.4.4 Breadth of Trade - The Extensive Margin

Lastly, the extensive goods margin of trade and thus the negotiations facilitating economic exchange are observed using the 3-digit Rauch specifications to transform trade volumes into 240 binary choices per country pair. That is: Does i export good c to country j? These choices are aggregated and used as the dependent variable in a PPML regression on conventional variables (specification (1)) and the single preference distances, (2) and (3,4) in Table 2.5. Legal system variables are added in (2) to match the previous methodology. Specifications (3) and (4) are identical to (2) in terms of variables, but analyze breadth of trade solely for differentiated (3) or non-differentiated goods (4).
Once again, the conventional variables have mostly expected results. Distance is negative and significant, whereas a colonial relationship and a common official language have positive and - except for *colony* in specification (3) - significant effects.[25] On the other hand, regional trade agreements have significant impacts only in specifications (2) and (4), which include parameters for the legal systems and trade in non-differentiated goods. This result is consistent with the interpretation that trade agreements require legal enforcement to be effective. Furthermore, it is not readily apparent why bilateral trade arrangements would expand the amount of goods categories traded. Above all, both partners will attempt to improve the terms of trade for their strengths, their specializations, not seek to expand trade into goods

[23]The latter is particularly notable as inclusion of a legal quality variable causes patience to become insignificant. The corresponding results are displayed in Table B.6 and Table B.7.

[24]In general, it should be noted that - as the effect sizes imply - these interpretations do not explain trade patterns as a whole, but rather anomalies within them.

[25]In that context, the non-significance of *lng* in PPML seems to be related to export volumes as dependent variable.

Table 2.5: Estimation of the Breadth of Trade

	Basic Grav.	Single. Pref. Dist	Differentiated Goods	Non-Differentiated Goods
	(1)	(2)	(3)	(4)
ldist	-0.25^{***}	-0.26^{***}	-0.23^{***}	-0.34^{***}
	(0.04)	(0.03)	(0.03)	(0.04)
contig	-0.07	-0.05	-0.04	-0.09
	(0.08)	(0.07)	(0.07)	(0.08)
colony	0.11^{*}	$0.09^{\cdot}$	0.06	0.16^{**}
	(0.05)	(0.05)	(0.05)	(0.05)
rta	0.01	$0.06^{\cdot}$	0.04	0.13^{**}
	(0.03)	(0.03)	(0.03)	(0.04)
lng	0.32^{***}	0.29^{***}	0.29^{***}	0.30^{***}
	(0.06)	(0.06)	(0.06)	(0.07)
comleg		0.09^{***}	0.08^{**}	0.12^{***}
		(0.03)	(0.03)	(0.03)
leg.qlt		0.07^{*}	0.07^{*}	0.05
		(0.03)	(0.03)	(0.03)
dpati		0.23^{***}	0.24^{***}	0.24^{***}
		(0.06)	(0.06)	(0.06)
drisk		-0.15^{**}	-0.15^{*}	-0.18^{**}
		(0.06)	(0.07)	(0.06)
dposrec		$-0.07^{\cdot}$	-0.09^{*}	-0.04
		(0.04)	(0.04)	(0.04)
dnegrec		0.08	0.09	0.07
		(0.06)	(0.06)	(0.08)
daltr		0.00	0.02	-0.04
		(0.04)	(0.04)	(0.05)
dtrus		-0.04	-0.03	-0.07
		(0.07)	(0.07)	(0.08)
Observations	5112.00	5112.00	5112.00	5112.00
Deviance	78802.90	73277.17	54906.48	27110.08
Exp./Imp. FE	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Breadth of trade is defined as the number of three-digit SITC goods categories with non-zero export values, i.e. $T_{ij} = \sum_c t_{cij}$. The variables of interest are the distances in preferences, included as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (2). Model (1) is a standard PPML gravity equation for comparison, specifications (3) and (4) estimate differentiated and non-differentiated goods, respectively. Standard errors are clustered to importer and exporter fixed effects.

categories where neither is specialized. Meanwhile, contiguity is never significant and possesses a negative coefficient throughout all three specifications, which might point to geographic clusters of countries with similar profiles. Proximity may also enhance national specialization and thus decrease the breadth of goods traded between such partners.

Distances in patience, risk and positive reciprocity appear significant for the breadth of trade between two nations.[26] Negative reciprocity, however, is no longer significant on any standard level. Insofar as willingness to punish and the value of the punishment increase with that of trade, this discrepancy does make sense. More intense relations would be burdened under higher potential costs - or risks - than lesser ones. In the face of a partner willing to punish, reduction of the exposure to that partner seems reasonable. Likewise, higher levels of negative reciprocity could be beneficial to the initial formation of trade by acting as a commitment enforcement device, thus countermanding the deterring influence of punishment costs and explaining the positive coefficient. Following that notion, the negative effect on aggregate volumes appears to be driven solely by the intensive margin, that is: by existing relationships being less intense. This is also consistent with specific trade relations being permanently discontinued by highly-punishing agents with a high degree of negative reciprocity.

Similarly, the distance in positive reciprocity changes its sign compared to its effect for the intensive margin of differentiated goods (see Table 2.3) and becomes negative. A one standard deviation increase in the distance of positive reciprocity would reduce the amount of goods traded by 2.68% and 1.2% for differentiated and non-differentiated goods, respectively; or 2.1% on aggregate. It could therefore be interpreted as an effect of cultural divide - the difference in approaches leading to misunderstandings preventing the formation of a contract. This argument aligns with the positive impact on the intensive margin - at which point the divide would be overcome - and the negative coefficient of *dposrec* for the value of non-differentiated goods exports[27]. Being less complicated and elaborate, these transactions benefit less from one side being more accommodating. For the same reason, the negative effect for the extensive margin of non-differentiated goods should be less pronounced - as is indeed observed in specification (4), where it becomes insignificant[28].

The difference in patience increases all trade connections by 7.6% per standard devi-

[26] In the second stage, none of the preferences is significant for the average trade barriers, though population and GDP per capita remain significant for importers and exporters as well as differentiated and non-differentiated goods alike (see Table B.12). This may showcase the limits of the preferences' influence or that of the breadth of trade approach to PPML.

[27] A Logit estimation (see footnote 8) of trade formation - i.e. the bilateral decision to trade in one specific commodity class - corroborates that interpretation, insofar as its coefficient for *dposrec* is likewise negative. This implies that such a distance makes it less likely to establish trade in any goods class and between any two countries with differing preference leanings. While no other preference distance is significant in that model, *dpref* - their unweighted average - is, implying that the negative impact of *dposrec* is related to this more general perceptional distance. See subsection B.7 for the results.

[28] The non-significance in the subset also explains the 10% level significance on the aggregate.

ation in patience. This positive effect supports the specialization channel described above in subsection 2.4.2. Likely, the more patient country in the respective pair invests more heavily in international trade to achieve further specialization gains. If so, countries with higher distances in patience would follow diverging specialization and investment paths, yielding different product sets and thus venues for trade.[29] This interpretation also fits the observation from the fixed effects analysis (see subsection 2.4.3) of high patience reducing (outward) export barriers for differentiated goods and low patience reducing them for non-differentiated commodities. Term orientation can, therefore, be seen as a motivation for specialization and trade.
Last, distances in risk negatively impact trade overall by 4.5% per additional standard deviation distance. Interpretation of this effect is not straightforward: a willingness to take risks could manifest as entering new business areas (i.e. another commodity class), whereas risk aversion could result in diversification over goods or partners. Referencing the average trade barrier results, the negative sign can be understood as a sign for risk transformation. In the resulting relationship, both partners focus on goods suitable to their risk profiles, specializing over that preference. The number of goods traded would reduce in the intensity of this transformation, while similarly inclined countries would lack this option and trade either less - given *drisk*'s positive sign in the volume specification - or with goods less geared to one another.[30]

2.5 Robustness

This section addresses potential robustness issues relating to either the GPS data, correlations with potential alternative explanations, sample and variable definitions.

2.5.1 Relationship with similar surveys

While the GPS is unique in its focus on decision-relevant preferences and experimental validation, some of its contents have been analysed before. Amongst them, the World Values Survey (WVS) (Jaeggi *et al.*, 2018) and the Hofstede Dimensions (Hofstede *et al.*, 2010) report measures for some of the Falk preferences. Therefore, these are ideally suited to control for potential measurement errors and sample biases in the GPS. Notably, analysing the unique GPS measure alongside the Hofstede and WVS measures for its non-unique parts.
Additionally, Wacziarg's genetic and religious distances (Spolaore and Wacziarg,

[29]Note that *dpati* only measures the squared distance between two countries' patience preference values. It does not capture whether the exporter or the importer has a higher patience, because it is not necessarily apparent that one tendency would be superior to the other. Such a direction variable is, however, not significant upon inclusion; nor does it alter the results.

[30]More generally, it must be noted that the commodity classes are relatively broad, so that they are an imprecise measure of breadth of trade as an expression of the sum of cross-country negotiations.

2016, 2018) are used to ascertain their relationship with preferences, controlling for potential links between these traits and preferences. This follows the literature on ancient origins of cultural and societal traits.

World Values Survey The World Values Survey is a global study designed to gather information on values and beliefs of different nations. It is a questionnaire containing items relating to the subject's personal and professional life, their beliefs, culture and values, as well as questions on the perceptions of their society. Among these, trust, altruism, risk and time preferences are addressed, allowing direct comparison with the GPS. 57 countries of the GPS are also included in the WVS, 47 of them contain all of the items, providing a sufficiently large set for comparison.
Jaeggi *et al.* (2018) have already calculated bilateral distances for the World Values Survey measures, which are used in this robustness check. The output table can be found in the appendix as Table B.13. Using their mean distance in World Values Survey items instead of the aggregated distance in GPS preferences does not alter the result noted in subsection 2.4.1. Both coefficients are insignificant on any level. When replacing trust, altruism, risk and time preferences with the WVS distances, the latter's time preferences become significant on the 5% level. Risk does not. This also holds true regardless of whether the GPS reciprocity measures are omitted or included. This discrepancy might result from the reduced sample size, if it is not random but - for example - biased by development standards. Depending on a person's (or nation's) material wealth, saving becomes easier and risk-aversion more logical given higher potential losses. This bias might also manifest differently depending on the phrasing of questions or the execution of experiments.
Notably, the main result of an adverse impact of negative reciprocity distances on trade remains significant. The coefficient is reduced from a 0.53 decrease to one of 0.43 when swapping Falk for WVS measures, which is still substantially and potentially a result of reducing sample size.

Hofstede Dimensions Geert Hofstede has modelled national culture as a six-dimensional model with the dimensions proposed as basic issues for societal organisation. These dimensions include long-term orientation and uncertainty avoidance, which correspond to patience and risk attitude in the GPS, thereby allowing comparison.
However, since the Hofstede dimensions are computed as the result of comparing a global set of countries, they lack the metrics needed to redefine them as bilateral measures. Consequently, they will be inserted into the second-stage fixed effects estimations. This, in turn, necessitates computation of the first-stage - the gravity equation - without preference distances to avoid confounding. This alteration causes patience to lose significance in the second-stage results, and reduces slightly the coefficient for risktaking[31]. This implies either a lack of robustness for the patience

[31]For detailed results, see Table B.14

measure or a less accurate definition of the fixed effects due to the omitted preference distances in the first stage.
Keeping this trade-off in mind, comparing regressions of patience and risktaking with *uncertainty avoidance* and *long-term versus short-term orientation* on average barriers yields different results. These are displayed in Table B.15 of the appendix. While patience and risk are significant in the GPS set - if, in case of patience, barely -, only long-term orientation is significant in the Hofstede set; and only for exporters of differentiated goods. Again, the reduction in sample size may affect accuracy adversely. The wider definition of Hofstede's indices in terms of values, moreale and philosophy also contrasts with the GPS' focus on economic decisions, further limiting accuracy. This points to the need for caution in defining preferences and surveys for their observation - as well as limiting their overall robustness.

Genetic and Religious Distance Thirdly, the relationship between preferences and other persistent, long-term drivers of cultural characteristics has to be considered, particularly common origins. To this end, measures for genetic and religious distance from Jaeggi *et al.* (2018) are used. Both aspects can be seen as persistent influences on developing characteristics of any nation's population and their distance relates to the (in-)frequency of interaction between any two nations. If not the causes, they can still be used as proxies for shared history or origins. Table B.16 shows the detailed results for weighted distances and for an alternative definition of these distances using only the dominant genetic or religious "group" within each country.
In the GPS sample, only the plurality measure for genetic distance is significant. Neither religious distances nor weighted genetic distance possess systematic effects on trade volumes, when preferences, legal systems and typical gravity variables are being included. Moreover, the significance and coefficient sizes of distances in negative reciprocity and risk are not being significantly impacted.

2.5.2 OECD subset

As mentioned before, economic preferences - and the experiments and questions with which they are measured - might be influenced by the economic situations of the subjects in question. Risk and patience in particular might be linked to the wealth and development path of the country in question beyond relationships covered by GDP per capita or institutional settings. If preferences are linked to economic characteristics, endogeneity could ensue through relationships between them and trade patterns and intensities.
The OECD, an organization of primarily western and comparatively wealthy nations, provides a suitable subset of countries less heterogeneous in terms of wealth, institutional quality and societal organisation. While this similarity mitigates the risk of endogeneity noted above, it also limits generality of results if preference distances impact trade differently for less developed nations. Additionally, the distri-

bution of preferences and their distances is significantly different within the OECD set compared to the whole GPS set[32]. Zero trade is also less common - lowered, on aggregate, from 6.5 to 1%, while the average value of bilateral exports is almost four times as high and the extensive goods margin roughly doubles.
All bilateral analysis conducted for the full sample are also applied to the OECD subset. With only 25 OECD members included in the GPS, fixed effects regressions are excluded due to the small sample size. For aggregate and separate differentiated and non-differentiated trade volumes, preference distances have stronger effects within the OECD than for the full GPS set - see Table B.19 and Table B.20 in the appendix for detailed results. Distance in negative reciprocity is similar in size and direction to the GPS results, though insignificant for non-differentiated goods. While this one non-significance runs counter to previous results, it must be noted that non-differentiated goods trade within the OECD accounts for 31% of the volume compared to 37% for the full set. Transferability of results is therefore limited[33] and the result for negative reciprocity holds for all but one specifications.
For positive reciprocity, the hypothesis of a beneficial effect from positively reciprocal gestures - e.g. gifts, perceptions of fairness - is emphasised by the significance and size of the respective coefficient. For distance in patience, the effect on all volumes is significant and positive, with one additional standard deviation in patience raising trade by 18.0%. This supports the term transformation and specialization hypotheses discussed previously in section 2.2, but contrasts with the results for the GPS set observed. This might result from a minimum level of patience being required to achieve these agreements and gain, or from a non-linear effect in that term transformation becomes impossible above some maximum distance. The average patience of 0.317 for the OECD subset - in contrast to net zero for the GPS - points towards such effects[34].

2.5.3 Partners of Trade

Instead of using average barriers, trade inclination could also be measured by the chosen number of trading partners per commodity or the average number of commodities traded with a given partner. These metrics yields an average of 87 out of 240 commodities per partner and 26 out of 72 countries per commodity with non-zero trade[35]. In both cases, the variance is about two times higher for exports compared

[32]The distribution of the preferences and distances for the OECD subset is shown in Table B.17 and Table B.18 of the appendix, respectively.

[33]The generality of the OECD robustness check is restricted further by the GPS' definition. As the distributions are normalized to the individual level of the full set, preferences in the OECD set need not follow that same normal distribution. They cannot be computed in the same manner either because non-normalized data is not provided.

[34]This contrast also underscores the potential of links between patience and economic development given the OECD's composition.

[35]Summary statistics are provided in Table B.22 of the appendix.

to imports, stressing heterogeneity in exporters.[36] Regressing these metrics on population, GDP per capita, landlocked status, average bilateral characteristics and preferences yields similar results to the primary extensive goods margin of trade specification in subsection 2.4.3: Only risktaking is significant - if on the 10% level -, and with diminishing effect on trade activity. Excluding average bilateral characteristics, which are themselves included here only for robustness purposes, raises significance of risktaking to the 5% level. This corroborates the diversification and risk transformation interpretation for risk averse players.

2.6 Conclusion

We have explored the potential influence of cross-country differences in the national preference structures of patience, risk attitude, reciprocity, trust and altruism on international trade flows. Using the novel GPS data set by Falk *et al.* (2018) and controlling for a wide set of alternative influences and explanations, we find several relations of interest. Chief among them, diverging levels in negative reciprocity are associated with significant reductions in bilateral trade volumes. We argue that this mainly results from mismatched views and expectations colliding during negotiations. Contract enforcement conduct, proposed and executed punishments for non-cooperative behavior and "grim trigger"-like strategies are possible catalysts for this mismatch, resulting in increased risks and costs of deals concluded in such a partnership.

In addition, we find two-tiered effects for patience and risk on trade. First, more patient or risk-averse countries tend to export more differentiated and less homogeneous goods, whereas the opposite holds true for more impatient or risk-tolerant countries. We attribute this to term and risk transformation effects, wherein the different preferences affect investment, production and trade patterns. As goods are subject to different risks and amortization cycles, including complexity of negotiations, players will self-select into products befitting their own preferences in that regard. This then provides them a comparative advantage in trade with these goods. Interestingly, we find a positive effect for the distance in patience on the extensive margin, which lends itself to the specialization argument. More opportunities exist between partners with different term preferences.

On the other hand, we find no significant effects of trust on trade, be it in levels or differences. This contrasts with the existing literature and, while largely owed to the abstract definition of the preferences, points to a need for further research on the composition of preferences. The same applies for negative reciprocity, where a separation into issues of costly punishment and revenge would be interesting. Also, the differences in effects observed across multilateral resistance terms as well as intensive and extensive margins deserve further attention, both within and without

[36] The smaller variation for importers also helps to explain the lack of significance for the average trade barriers of importers.

the context of preferences. In that vein, we also detect divergence between the effects for distance in positive reciprocity. It is beneficial for volumes, but adverse for the extensive goods margin, which - in a dynamic setting - could be understood as a stabilizing effect of unexpected acts of positive reciprocity (e.g. gifts) that is impossible prior to formation.
Nonetheless, we introduce a number of hitherto unknown potential determinants of trade and mechanisms for their effects. While we cannot - yet - speak of causal inference, term, risk and reciprocity attitudes present an intriguing approach towards explaining certain anomalies in trade flows and behaviors not covered by conventional theory. We also join the literature strands on trade, behavioral economics and contracts with one another, tying trade outcomes to the people deciding upon their design. In terms of further research, formalization of our proposed mechanisms, the relationship between preferences and institutional environments, and a breakdown of negative reciprocity into its different shades would seem most fruitful.
Our results suggest that behavioral motivations and aspects can matter in trade. Preferences provide a rationale and mechanism for anomalies in trade flows. They offer an expansion to cultural distances, but also a methodical means for these to express themselves. In terms of policy implications, they define limits to the effects of infrastructure, institutions and political action. This includes trade agreements, which could focus on term and risk transformation aspects as well as alleviate concerns regarding the risk of unfair punishments. Supranational mediators for firms' trade disputes would appear a measure suitable to reducing these risks by delegating the punishment to a neutral court.

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Appendix

B.1 Substitutes for Import Data

Eight countries had not reported any data by the time the data was downloaded. These missing entries were replaced with existing export data by their reporting partner nations. This method is potentially biased due to the complete lack of data on trade between these eight countries and potential reporting errors with regards to the traded volumes. While the former issue cannot be addressed with the data available, the latter issue can be investigated by comparing export and import flows of all countries within the GPS set that do report their foreign trade. For these countries, average exports and imports to all other reporting countries in the set are computed as well as standard deviations for these flows.
The two resulting distributions can then be tested against the null hypothesis of being drawn from the same population by conducting Kolmogorov-Smirnov tests. That null hypothesis cannot be dismissed for the two- or either one-sided test. Figure B.1, depicting the distributions of the means and standard deviations for all 68 reporting countries, visualizes the similarity between the two report classes. Given these results, the export data can thus be used as replacement for imports of non-reporting countries.
For robustness, all estimates have also been conducted for a subset including reporting countries only. In these estimations, all effects grow in significance and size in the extensive margins. In the intensive margin, patience and its distance become less pronounced or even non-significant, while the effect of risk becomes slightly stronger in distances and levels.

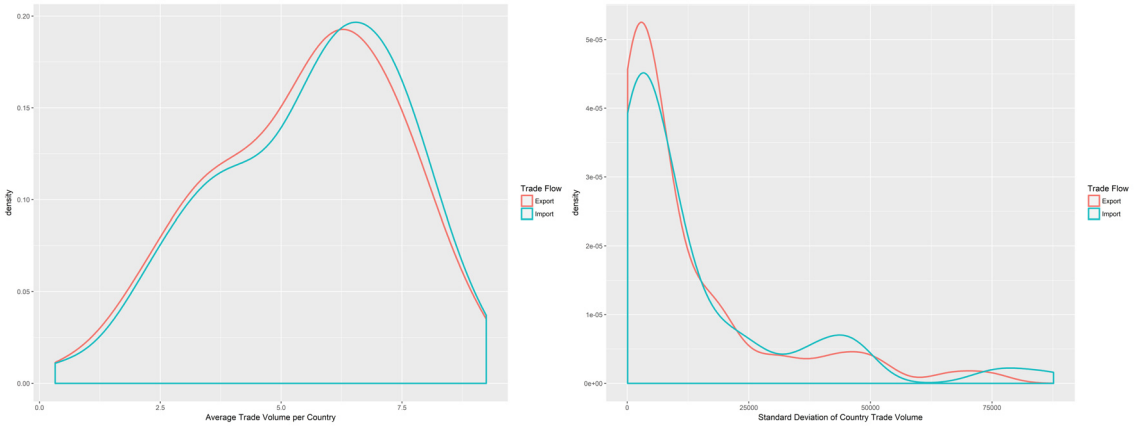

Figure B.1: The density functions of the mean (left) and standard deviation (right) of each origin country's trade with all other reporting partners within the GPS set.

Table B.1: Summary Statistics for Distances in Preferences

Statistic	N	Mean	St. Dev.	Min	Max
dpati	5,256	0.415	0.331	0.0001	1.684
drisk	5,256	0.338	0.273	0.0001	1.763
dposrec	5,256	0.382	0.298	0.0005	1.608
dnegrec	5,256	0.309	0.236	0.00002	1.228
daltr	5,256	0.386	0.305	0.0001	1.846
dtrus	5,256	0.317	0.236	0.0001	1.315
dpref	5,256	0.358	0.124	0.061	0.812

Table B.2: Summary Statistics for Trade on Goods category-level

Statistic	N	Mean	St. Dev.	Min	Max
Trading	1,261,440	0.360	0.480	0	1
Volume	1,261,440	8,935,006.000	228,039,017.000	0	74,214,173,234

Notes: *Trading* is a dummy variable which takes value 1 when a specific goods category is traded between a given country pair and 0 otherwise. *Volume* is the volume exported from one country to a specific partner country. For each variable, key distributional statistics are provided.

Table B.3: Summary Statistics for Bilateral Trade Outcomes

Statistic	N	Mean	St. Dev.	Min	Max
Volume (in mio.$)	5,256	2,144.40	11,944,18	0	425,430.22
Trade Links	5,256	86.317	71.344	0	224
Avg. Exp. Partner	5,256	67.342	5.756	47	72
Avg. Imp. Partner	5,256	67.342	5.990	48	72

Notes: Volume is the average value of goods exported from country i to country j for all countries in the set. *Trade Links* is the average number of goods exported from i to j, again for all country pairs. *Avg. Exp. Partner* and *Avg. Imp. Partner* denote the average number of partners for a given exporter and importer, respectively.

B.2 Summary Statistics for Trade and Preferences

B.3 Fixed Effects on aggregate trade

The exporter and importer fixed effects for aggregate bilateral trade volumes are extracted from specification (5) of the standard gravity estimations shown in Table 2.2. For both effects, four specifications are used and shown in Table B.4 and Table B.5, starting with a baseline (1) including only population, GDP per capita, landlocked status and the average bilateral characteristics parameter. In specification (2), the single preferences are added, whose effect is then controlled for potential correlation with institutional (3) and legal (4) parameters. The former are drawn from the Freedom House (2018) indices on public representation (*PR Rating*), civil liberties (*CL Rating*) and liberal nature (*Free* and *PartFree* dummies) of the state surveyed, whereas the latter is the rule of law indicator (*rle*) from the WGI (2009) whose differences are used in the gravity specifications. Since preferences may matter more when institutional restrictions and assurances are insufficient, their inclusion might be relevant to prevent omitted variable biases. Population, GDP per capita and landlocked status have the expected effects. All preferences, however, are insignificant as determinants of the average trade barriers for aggregated trade. Considering the diametrically opposed effects observed in the second stage for differentiated and non-differentiated goods, this result is plausible.

B.4 Fixed Effects on Differentiated and Non-Differentiated Goods

The exporter and importer fixed effects for bilateral trade volumes for differentiated and non-differentiated goods are extracted from the specifications used for single preference distance analysis in subsection 2.4.2, which is itself identical to specification (5) of the total trade volumes (see Table 2.2) but used on the two sets for the split goods categories. Results for differentiated goods are shown first (Table B.6, Table B.7), those for non-differentiated goods second (Table B.8, Table B.9) - in each case, the first table displays exporter and the second importer effects.
As with aggregated trade, control variables for the institutional and legal quality are added in specifications (3) and (4), while (1) is a baseline estimation with the conventional variables only. In (2), the single preference variables are added without further controls - this specification is also the one used in Table 2.4. In all specifications, the conventional variables are significant, while preferences matter for exporters only.

B.5 Differentiated Goods

For differentiated goods, a higher willingness to tolerate risk is associated with an lower inclination towards exporting of differentiated goods. This effect is significant in specifications (2) and (4) with only small differences in its coefficient. However,

Table B.4: Robustness Estimations of Exporter Fixed Effects

	Baseline	Single Pref.	Single Pref. Rights	Single Pref. Legal
(Intercept)	22.12***	21.04***	21.75***	21.51***
	(3.39)	(3.78)	(4.20)	(3.87)
avg.char	−0.10	−0.33	−0.45	−0.22
	(0.68)	(0.77)	(0.79)	(0.79)
pop	0.04***	0.03***	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.59***	0.57***	0.54**	0.63**
	(0.08)	(0.15)	(0.17)	(0.18)
landlocked	−1.30**	−1.21*	−1.29*	−1.24*
	(0.45)	(0.49)	(0.52)	(0.50)
patience		−0.14	−0.33	0.00
		(0.78)	(0.89)	(0.82)
risktaking		0.40	0.61	0.32
		(0.66)	(0.72)	(0.68)
posrecip		0.16	0.13	0.18
		(0.80)	(0.82)	(0.80)
negrecip		0.31	0.41	0.27
		(0.66)	(0.71)	(0.66)
altruism		−0.38	−0.37	−0.44
		(0.75)	(0.79)	(0.76)
trust		0.89	0.77	0.88
		(0.67)	(0.72)	(0.67)
‘PR Rating‘			0.07	
			(0.36)	
‘CL Rating‘			−0.28	
			(0.37)	
Free			−0.87	
			(1.47)	
PartFree			−0.75	
			(0.88)	
rle				−0.20
				(0.31)
R^2	0.54	0.56	0.58	0.57
Adj. R^2	0.51	0.49	0.47	0.49
Exp./Imp. FE	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach. Exporter fixed effects are extracted from Table 2.2 specification (5) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Column (1) shows a regression on conventional country characteristics. (2) adds the single preferences in level, (3) and (4) add different institutional and legal quality controls.

Table B.5: Robustness Estimations of Importer Fixed Effects

	Baseline	Single Pref.	Single Pref. Rights	Single Pref. Legal
(Intercept)	−0.04	−0.85	0.46	−1.06
	(2.74)	(3.09)	(3.39)	(3.17)
avg.char	0.20	0.04	−0.05	−0.01
	(0.55)	(0.63)	(0.64)	(0.65)
pop	0.03***	0.03***	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.53***	0.55***	0.56***	0.52***
	(0.07)	(0.13)	(0.14)	(0.15)
landlocked	−1.03**	−0.95*	−1.04*	−0.94*
	(0.36)	(0.41)	(0.42)	(0.41)
patience		−0.31	−0.78	−0.37
		(0.64)	(0.72)	(0.67)
risktaking		0.16	0.52	0.19
		(0.54)	(0.59)	(0.56)
posrecip		0.09	0.08	0.08
		(0.65)	(0.66)	(0.66)
negrecip		0.41	0.66	0.43
		(0.54)	(0.57)	(0.55)
altruism		−0.12	−0.16	−0.09
		(0.61)	(0.64)	(0.62)
trust		0.38	0.37	0.38
		(0.55)	(0.59)	(0.55)
'PR Rating'			0.15	
			(0.29)	
'CL Rating'			−0.49	
			(0.30)	
Free			−1.18	
			(1.19)	
PartFree			−0.60	
			(0.71)	
rle				0.09
				(0.26)
R^2	0.59	0.60	0.62	0.60
Adj. R^2	0.57	0.54	0.53	0.53
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach. Importer fixed effects are extracted from Table 2.2 specification (5) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Column (1) shows a regression on conventional country characteristics. (2) adds the single preferences in level, (3) and (4) add different institutional and legal quality controls.

Table B.6: Robustness Estimations of Exporter Fixed Effects - Differentiated Goods

	Baseline	Single Pref.	Single Pref. Rights	Single Pref. Legal
(Intercept)	22.97***	19.30***	19.17***	18.24***
	(4.49)	(4.66)	(5.07)	(4.74)
avg.char	0.64	−0.35	−0.58	−0.63
	(1.02)	(1.07)	(1.05)	(1.10)
pop	0.05***	0.04**	0.04***	0.04**
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.78***	0.43*	0.43·	0.28
	(0.12)	(0.21)	(0.22)	(0.25)
landlocked	−1.63*	−1.41*	−1.44*	−1.35*
	(0.65)	(0.67)	(0.67)	(0.67)
patience		1.86·	0.63	1.51
		(1.06)	(1.15)	(1.10)
risktaking		−2.25*	−1.49	−2.06*
		(0.90)	(0.94)	(0.91)
posrecip		0.97	0.91	0.91
		(1.08)	(1.06)	(1.08)
negrecip		0.64	1.41	0.73
		(0.89)	(0.91)	(0.89)
altruism		−0.84	−0.90	−0.70
		(1.02)	(1.01)	(1.02)
trust		0.46	0.89	0.47
		(0.91)	(0.94)	(0.91)
'PR Rating'			0.88·	
			(0.46)	
'CL Rating'			−1.24*	
			(0.48)	
Free			0.13	
			(1.90)	
PartFree			0.43	
			(1.14)	
rle				0.48
				(0.42)
R^2	0.50	0.57	0.62	0.58
Adj. R^2	0.47	0.50	0.53	0.50
Num. obs.	72	72	72	72

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, ·$p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach for differentiated-goods only. Exporter fixed effects are extracted from Table 2.3 specification (2) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Column shows a regression on conventional country characteristics. (2) adds the single preferences in level, (3) and (4) add different institutional and legal quality controls.

Table B.7: Robustness Estimations of Importer Fixed Effects - Differentiated Goods

	Baseline	Single Pref.	Single Pref. Rights	Single Pref. Legal
(Intercept)	−0.34	−0.79	0.61	−0.75
	(2.60)	(2.87)	(3.27)	(2.96)
avg.char	0.15	0.05	−0.04	0.06
	(0.59)	(0.66)	(0.68)	(0.68)
pop	0.03***	0.03***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.53***	0.55***	0.55***	0.56***
	(0.07)	(0.13)	(0.14)	(0.15)
landlocked	−0.97*	−0.92*	−1.00*	−0.92*
	(0.37)	(0.41)	(0.43)	(0.42)
patience		−0.31	−0.65	−0.30
		(0.66)	(0.74)	(0.69)
risktaking		0.34	0.63	0.33
		(0.56)	(0.61)	(0.57)
posrecip		0.30	0.27	0.30
		(0.67)	(0.68)	(0.67)
negrecip		0.16	0.32	0.16
		(0.55)	(0.59)	(0.56)
altruism		−0.24	−0.25	−0.24
		(0.63)	(0.65)	(0.64)
trust		0.56	0.51	0.56
		(0.56)	(0.61)	(0.57)
‘PR Rating‘			0.04	
			(0.30)	
‘CL Rating‘			−0.36	
			(0.31)	
Free			−1.23	
			(1.23)	
PartFree			−0.71	
			(0.73)	
rle				−0.02
				(0.26)
R^2	0.56	0.58	0.59	0.58
Adj. R^2	0.53	0.51	0.49	0.50
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach for differentiated-goods only. Importer fixed effects are extracted from Table 2.3 specification (2) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Column (1) shows a regression on conventional country characteristics. (2) adds the single preferences in level, (3) and (4) add different institutional and legal quality controls.

it loses significance when controlling for political rights and civil liberties. Both of these variables are numerical, but with lower values signalling a higher status. Thus, risktaking and the legal regime of a country appear to be correlated. A legal regime and its institutions will influence perceptions of uncertainty within a given society. This uncertainty may in turn influence risk attitudes, in that risks and their associated costs might be over- or understated depending on dependability and reliability of a legal system. While it is beyond the scope of this analysis to explicitly define such a relation, the preferences are better understood as a channel by which cultural, historic or other soft national characteristics affect trade flows.
Patience also loses significance when including the Freedom House measures, which is likely attributable to both variables' correlation with GDP (see Dohmen *et al.*, 2016), causing multicorrelation issues regarding estimation efficiency in the small set. Additionally, it has been argued that Freedom House suffers from bias evaluating US-friendly states - which are usually also western and wealthier - more positively (Steiner, 2012). That would likely bias the variable in a direction coinciding with America's patience and risk inclinations. On the other hand, patience might also result in stronger civic liberties - given their presumed long-term benefit of more efficient allocation.

B.6 Non-Differentiated Goods

For non-differentiated goods, results are similar to those of differentiated goods. Risktaking is significance throughout all exporter specifications, but close to zero for the importer effects. Its coefficient changes from 1.96 to 1.83 throughout these specifications and remains significant on, at least, the 5% level. Patience is significant only in specification (2) of the exporter effects, though its coefficient remains negative throughout and its significance level just slightly above the - albeit still low - 10% level.

B.7 Binomial Estimation of Bilateral Good-Specific Trade

The model presented in footnote 8 of section 2.2 is estimated using a Logit link function and the same variables and specifications as used for aggregated and separated volume sets. The resulting specifications - shown in Table B.10 estimate the likelihood of goods from a specific 3-digit goods classification being traded between one direction-specific country pair. Therefore, it is estimated not over 5112 bilateral pairs but over 1.226.880 bilateral goods combinations. The origin/destination fixed effects are supplemented by a commodity class dummy. It should be noted that these specifications suffer from the incidental parameter problem, wherein consistency is not achieved as the number of parameters increases equipollent with that of observations (cf. Neyman *et al.*, 1948).
All conventional variables have significant and robust effects with only little variance across the five specifications. In contrast to PPML, the coefficient for *common official language* is both significant and positive, which supports the observations of

Table B.8: Robustness Estimations of Exporter Fixed Effects - Non-Differentiated Goods

	Baseline	Single Pref.	Single Pref. Rights	Single Pref. Legal
(Intercept)	19.34***	20.55***	21.65***	21.30***
	(3.86)	(4.05)	(4.41)	(4.13)
avg.char	−0.63	−0.39	−0.51	−0.27
	(0.56)	(0.59)	(0.61)	(0.61)
pop	0.03**	0.03***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.53***	0.75***	0.71***	0.85***
	(0.09)	(0.16)	(0.18)	(0.19)
landlocked	−1.18*	−1.31*	−1.36*	−1.35*
	(0.49)	(0.51)	(0.53)	(0.51)
patience		−1.60*	−1.41	−1.38
		(0.80)	(0.90)	(0.83)
risktaking		1.96**	1.95*	1.83*
		(0.68)	(0.74)	(0.69)
posrecip		0.26	0.21	0.28
		(0.82)	(0.83)	(0.82)
negrecip		−0.20	−0.36	−0.26
		(0.68)	(0.72)	(0.68)
altruism		−0.50	−0.43	−0.59
		(0.77)	(0.80)	(0.77)
trust		0.84	0.58	0.84
		(0.69)	(0.74)	(0.69)
'PR Rating'			−0.36	
			(0.36)	
'CL Rating'			0.13	
			(0.38)	
Free			−1.50	
			(1.49)	
PartFree			−1.30	
			(0.89)	
rle				−0.30
				(0.32)
R^2	0.43	0.52	0.54	0.53
Adj. R^2	0.39	0.44	0.43	0.44
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach for non-differentiated-goods only. Exporter fixed effects are extracted from Table 2.3 specification (2) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Column (1) shows a regression on conventional country characteristics. (2) adds the single preferences in level, (3) and (4) add different institutional and legal quality controls.

Table B.9: Robustness Estimations of Importer Fixed Effects - Non-Differentiated Goods

	Non-Diff. Goods: Importer Fixed Effects			
	Baseline	Single Pref.	Single Pref. Rights	Single Pref. Legal
(Intercept)	−1.60	−2.61	−1.30	−2.99
	(2.92)	(3.29)	(3.53)	(3.37)
avg.char	−0.09	−0.22	−0.29	−0.29
	(0.42)	(0.48)	(0.49)	(0.50)
pop	0.04***	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.52***	0.55***	0.57***	0.50**
	(0.07)	(0.13)	(0.14)	(0.15)
landlocked	−1.06**	−0.92*	−1.03*	−0.90*
	(0.37)	(0.41)	(0.42)	(0.41)
patience		−0.37	−0.93	−0.48
		(0.65)	(0.72)	(0.68)
risktaking		−0.00	0.42	0.06
		(0.55)	(0.59)	(0.56)
posrecip		−0.16	−0.14	−0.17
		(0.66)	(0.67)	(0.67)
negrecip		0.71	1.02.	0.74
		(0.55)	(0.58)	(0.56)
altruism		0.15	0.06	0.19
		(0.62)	(0.64)	(0.63)
trust		0.24	0.23	0.24
		(0.56)	(0.59)	(0.56)
'PR Rating'			0.25	
			(0.29)	
'CL Rating'			−0.60.	
			(0.30)	
Free			−1.17	
			(1.19)	
PartFree			−0.51	
			(0.72)	
rle				0.15
				(0.26)
R^2	0.60	0.61	0.64	0.62
Adj. R^2	0.57	0.55	0.55	0.55
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{.}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach for non-differentiated-goods only. Importer fixed effects are extracted from Table 2.3 specification (2) and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Column (1) shows a regression on conventional country characteristics. (2) adds the single preferences in level, (3) and (4) add different institutional and legal quality controls.

Table B.10: Binomial Estimation of Goods-specific Bilateral Trade Links

	Basic Grav.	Agg. Pref. Dist.	Agg. Pref. Dist	Single Pref. Dist.	Single Pref. Dist.
	(1)	(2)	(3)	(4)	(5)
ldist	-1.03^{***}	-1.02^{***}	-1.03^{***}	-1.03^{***}	-1.03^{***}
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
contig	0.72^{***}	0.72^{***}	0.72^{***}	0.71^{***}	0.71^{***}
	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)
colony	0.74^{***}	0.74^{***}	0.73^{***}	0.74^{***}	0.73^{***}
	(0.12)	(0.12)	(0.11)	(0.12)	(0.12)
rta	0.19^{*}	0.18^{*}	0.20^{**}	0.19^{*}	0.21^{**}
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
lng	0.77^{***}	0.76^{***}	0.76^{***}	0.75^{***}	0.75^{***}
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
dpref		-0.40^{*}	-0.45^{*}		
		(0.20)	(0.19)		
leg.qlt 2			0.02		0.01
			(0.02)		(0.02)
dpati				0.11	0.08
				(0.12)	(0.12)
drisk				−0.27	−0.27
				(0.18)	(0.18)
dposrec				-0.26^{**}	-0.26^{**}
				(0.10)	(0.10)
dnegrec				0.08	0.09
				(0.11)	(0.11)
daltr				0.05	0.06
				(0.10)	(0.10)
dtrus				−0.13	−0.13
				(0.12)	(0.12)
Observations	1226880.00	1226880.00	1226880.00	1226880.00	1226880.00
Deviance	775510.36	775353.24	775265.77	774811.41	774788.51
Country, Goods FE	YES	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Bilateral Trade Links are defined as a dummy variable with value 1 when one country i exports goods in a given SITC three-digit goods category with a given partner j, formally: $t_{cij} = 1, \text{if} x_{cij} > 0$ and zero otherwise. This specification aims to analyse determinants of the formation of trade. The variables of interest are the differences in preferences, included as an unweighted average *dpref* in (2,3) and as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (4,5). Commonalities in legal systems are included in models (3) and (5) due to their potential impact on negotiations, the channel of interest. Model (1) is a standard gravity equation for comparison. Standard errors are clustered to importer, exporter and goods fixed effects. The coefficients of the conventional gravity variables all have the desired signs and are significant on, at least, the 5% level. Differences in the unweighted average of preference are significant (2), even when accounting for the legal systems (3), whereas only one of the single preference distances is significant, namely *dposrec*. The effects can be interpreted as changes in the likeliness of a specific bilateral trade flow becoming non-zero - or: being formed. That likelihood is then adversely impacted by different preference leanings of the national populations in question.

Melitz and Toubal (2014) with regards to the peculiarity of PPML in this regard. Compared with the meta-results presented by Head and Mayer (2014), the coefficients fall within the range of typical structural gravity estimates, pointing to - at least - a limited robustness of the binomial estimation.
While, of the single preferences, only distance in positive reciprocity is significant - and negative, this model for the formation of trade in goods classes is the only one outside the OECD set in which the average distance in preferences (*dpref*) has an effect, namely a negative one significant on the 5% level. Like the effect of reciprocity, this is likely an influence similar to cultural distance. The diverging preference leanings make it more difficult to reach an initial agreement, thus reducing the likelihood of formation of trade.

B.8 Further Breadth of Trade specifications

B.9 PPML estimation of the Breadth of Trade, with *dpref*

Table B.11 shows PPML breadth of trade regressions corresponding to the specifications used for aggregate and separate volume data. Specifications (1) and (5) are the ones also displayed in Table 2.5 as specifications (1) and (2). Results for aggregate preference distances - with and without legal variables - are shown in columns (3) and (2), while column (4) shows the regression on single preference distances without legal parameters. Coinciding with the results for the Binomial specification, the average distance in preferences is significant when estimated without legal controls (column 2). Aside from this observation, the results are in line with those shown and analysed in Table 2.5.

B.10 Fixed Effects of the Breadth of Trade

Table B.12 shows the results for the second stage estimations using the fixed effects of the breadth of trade specification with single preference distances and legal controls. The specifications are equivalent to those shown in Table 2.4 of subsection 2.4.3. None of the preference measures - except for altruism on the 10%-level - are significant determinants of the fixed effects as estimated in the PPML derivative. Due to the modification of the PPML equation and the limited sample size for the fixed effects, these results need to be viewed with caution. On the other hand, the results may also point to the limitations of GPS preferences as an effect channel for the influence of cultural and historical factors on trade outcomes.

B.11 Tables of the Robustness Section

Table B.11: Estimation of the Breadth of Trade with Aggregate Preference Distance

	Basic Grav.	Agg. Pref. Dist.	Agg. Pref. Dist	Single Pref. Dist.	Single Pref. Dist.
	(1)	(2)	(3)	(4)	(5)
ldist	-0.25^{***}	-0.26^{***}	-0.26^{***}	-0.26^{***}	-0.26^{***}
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
contig	-0.07	-0.07	-0.05	-0.04	-0.05
	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
colony	0.11^{*}	0.11^{*}	$0.09^{\cdot}$	0.11^{*}	$0.09^{\cdot}$
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
rta	0.01	0.02	0.08^{*}	0.03	$0.06^{\cdot}$
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
lng	0.32^{***}	0.33^{***}	0.28^{***}	0.33^{***}	0.29^{***}
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
dpref		0.37^{*}	0.15		
		(0.15)	(0.12)		
comleg			0.09^{**}		0.09^{***}
			(0.03)		(0.03)
leg.qlt			0.12^{***}		0.07^{*}
			(0.03)		(0.03)
dpati				0.31^{***}	0.23^{***}
				(0.05)	(0.06)
drisk				-0.19^{**}	-0.15^{**}
				(0.06)	(0.06)
dposrec				$-0.07^{\cdot}$	$-0.07^{\cdot}$
				(0.04)	(0.04)
dnegrec				0.09	0.08
				(0.06)	(0.06)
daltr				-0.00	0.00
				(0.04)	(0.04)
dtrus				-0.04	-0.04
				(0.07)	(0.07)
riskdir					0.00
					(0.03)
Observations	5112.00	5112.00	5112.00	5112.00	5112.00
Deviance	78802.90	78226.31	75153.86	74375.44	73276.92
Exp./Imp. FE	YES	YES	YES	YES	

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Bilateral breadth of trade is defined as the number of three-digit SITC goods categories with non-zero export values, i.e. $T_{ij} = \sum_c t_{cij}$. The variables of interest are the differences in preferences, included as an unweighted average *dpref* in (2,3) and as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (4,5). Commonalities in legal systems are included in models (3) and (5) due to their potential impact on negotiations, the channel of interest. Model (1) is a standard gravity equation for comparison. Standard errors are clustered to importer and exporter fixed effects.

Table B.12: Estimation Fixed Effects Composition for Breadth of Trade

	Differentiated Goods		Non-Differentiated Goods	
	Exporter	Importer	Exporter	Importer
	(1)	(2)	(3)	(4)
(Intercept)	4.28^{*}	-1.10	3.55	-1.14
	(1.93)	(0.88)	(2.18)	(1.13)
avg.char	-0.51	-0.48	-0.53	-0.31
	(1.00)	(0.46)	(0.75)	(0.39)
pop	0.01^{**}	0.01^{**}	0.02^{***}	0.01^{***}
	(0.00)	(0.00)	(0.00)	(0.00)
gdpcap	0.18^{*}	0.08^{*}	0.25^{**}	0.12^{**}
	(0.07)	(0.03)	(0.08)	(0.04)
landlocked	-0.63^{**}	-0.10	-0.57^{*}	-0.19
	(0.22)	(0.10)	(0.26)	(0.14)
patience	0.22	0.02	0.19	0.04
	(0.35)	(0.16)	(0.41)	(0.21)
risktaking	-0.36	0.06	-0.08	0.05
	(0.29)	(0.13)	(0.35)	(0.18)
posrecip	0.57	-0.05	0.62	0.02
	(0.36)	(0.16)	(0.42)	(0.22)
negrecip	0.32	0.05	0.20	0.18
	(0.29)	(0.13)	(0.34)	(0.18)
altruism	$-0.58^{\cdot}$	-0.05	$-0.69^{\cdot}$	-0.05
	(0.34)	(0.15)	(0.40)	(0.21)
trust	0.10	0.01	-0.00	0.03
	(0.30)	(0.14)	(0.35)	(0.18)
R^2	0.52	0.37	0.52	0.46
Adj. R^2	0.45	0.27	0.44	0.37
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach. Exporter and importer fixed effects are extracted from Table 2.5 specifications (2) and (4) - for differentiated and non-differentiated goods - and estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. Columns (1) and (2) show country characteristics for differentiated goods and (3) and (4) for non-differentiated goods. Exporter results are displayed first in each case.

Table B.13: Estimation of aggregated bilateral exports using World Values Survey

	Agg. Pref. Dist.	Agg. WVS Dist.	Single Pref. Dist	Single WVS Dist.	Joined Dist.
	(1)	(2)	(3)	(4)	(5)
ldist	-0.59^{***}	-0.57^{***}	-0.59^{***}	-0.57^{***}	-0.57^{***}
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
contig	0.48^{***}	0.49^{***}	0.49^{***}	0.54^{***}	0.56^{***}
	(0.14)	(0.15)	(0.14)	(0.15)	(0.14)
colony	0.31^{**}	0.37^{***}	0.34^{***}	0.41^{***}	0.40^{***}
	(0.10)	(0.11)	(0.09)	(0.11)	(0.10)
rta	0.32^{**}	0.39^{***}	0.34^{***}	0.41^{***}	0.41^{***}
	(0.10)	(0.08)	(0.09)	(0.07)	(0.07)
lng	-0.07	-0.03	-0.07	0.09	0.10
	(0.12)	(0.09)	(0.13)	(0.10)	(0.10)
comleg	0.18^{*}	0.15^{*}	0.16^{*}	0.10	0.05
	(0.07)	(0.07)	(0.07)	(0.09)	(0.08)
leg.qlt	0.14^{***}	0.13^{**}	0.15^{***}	0.14^{***}	0.13^{***}
	(0.02)	(0.04)	(0.03)	(0.03)	(0.03)
dpref	-0.31				
	(0.35)				
DWvsMean		1.01			
		(3.59)			
dpati			-0.15		
			(0.10)		
drisk			$0.50^{\cdot}$		
			(0.26)		
dposrec			-0.01		0.04
			(0.21)		(0.18)
dnegrec			-0.53^{***}		-0.43^{*}
			(0.16)		(0.17)
daltr			-0.09		
			(0.11)		
dtrus			0.09		
			(0.18)		
Dtrust				-0.06	-0.08
				(0.76)	(0.73)
Daltruism				-0.39	-0.47
				(0.60)	(0.65)
Drisk				0.02	-0.15
				(1.47)	(1.33)
Dtimepref				1.27^{*}	1.22^{*}
				(0.56)	(0.53)
Observations	5112.00	3192.00	5112.00	2156.00	2156.00
Deviance	4653839002672.03	3702376242311.60	4556478256897.52	2724293614237.49	2702716621696.36
Exp./Imp. FE	YES	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Models (1) and (3) include the unweighted average of the preference distances and the single preference distances, respectively. Models (2) and (4) replace these values with information from the World Values Survey, as defined by Jaeggi *et al.* (2018) for contrast and comparison. In Model (5), the two surveys are joined, with the WVS measures replacing their Falk equivalents.

Table B.14: Average Trade Barriers without Preference Distances

	Differentiated Goods		Non-Differentiated Goods	
	Exporter	Importer	Exporter	Importer
	(1)	(2)	(3)	(4)
(Intercept)	18.24***	−0.75	21.30***	−2.99
	(4.74)	(2.96)	(4.13)	(3.37)
avg.char	−0.63	0.06	−0.27	−0.29
	(1.10)	(0.68)	(0.61)	(0.50)
pop	0.04**	0.03***	0.03***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.28	0.56***	0.85***	0.50**
	(0.25)	(0.15)	(0.19)	(0.15)
landlocked	−1.35*	−0.92*	−1.35*	−0.90*
	(0.67)	(0.42)	(0.51)	(0.41)
patience	1.51	−0.30	−1.38	−0.48
	(1.10)	(0.69)	(0.83)	(0.68)
risktaking	−2.06*	0.33	1.83*	0.06
	(0.91)	(0.57)	(0.69)	(0.56)
posrecip	0.91	0.30	0.28	−0.17
	(1.08)	(0.67)	(0.82)	(0.67)
negrecip	0.73	0.16	−0.26	0.74
	(0.89)	(0.56)	(0.68)	(0.56)
altruism	−0.70	−0.24	−0.59	0.19
	(1.02)	(0.64)	(0.77)	(0.63)
trust	0.47	0.56	0.84	0.24
	(0.91)	(0.57)	(0.69)	(0.56)
rle	0.48	−0.02	−0.30	0.15
	(0.42)	(0.26)	(0.32)	(0.26)
R^2	0.58	0.58	0.53	0.62
Adj. R^2	0.50	0.50	0.44	0.55
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The Fixed Effects represent Average Trade Barriers and are estimated via a two-step approach. Exporter and importer fixed effects are extracted from the Basic Gravity equation of subsection 2.4.1 Standard Gravity, but applied to differentiated and non-differentiated goods separately. They are then estimated via OLS using unilateral size and location variables, the average bilateral characteristics relating to the country in question and the single preference variables. The level of rule of law is also included, as its distance is - as with the preferences - excluded in the first stage. Columns (1) and (2) show country characteristics for differentiated goods and (3) and (4) for non-differentiated goods. Exporter results are displayed first in each case.

Table B.15: Hofstede & GPS

	Second Stage: Exporter			
	Differentiated Goods		Non-Differentiated Goods	
	(1)	(2)	(3)	(4)
(Intercept)	21.01***	16.84***	21.47***	12.92**
	(4.33)	(4.58)	(3.70)	(4.12)
avg.char	0.06	−0.94	−0.25	−1.52*
	(0.99)	(1.00)	(0.54)	(0.57)
pop	0.04**	0.02*	0.03***	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.47*	0.32**	0.79***	0.41***
	(0.20)	(0.11)	(0.15)	(0.09)
landlocked	−1.44*	−0.14	−1.34**	−0.79
	(0.62)	(0.77)	(0.47)	(0.63)
patience	1.94·		−1.68*	
	(1.03)		(0.78)	
risktaking	−2.36**		1.88**	
	(0.80)		(0.61)	
uai		0.00		0.02
		(0.01)		(0.01)
ltowvs		0.02*		−0.01
		(0.01)		(0.01)
R^2	0.56	0.44	0.50	0.49
Adj. R^2	0.52	0.35	0.46	0.41
Num. obs.	72	44	72	44

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

	Second Stage: Importer			
	Differentiated Goods		Non-Differentiated Goods	
	(5)	(6)	(7)	(8)
(Intercept)	−0.08	−6.81*	−1.34	−8.94*
	(2.66)	(3.33)	(3.01)	(3.33)
avg.char	0.23	−1.35·	−0.03	−1.11*
	(0.61)	(0.72)	(0.44)	(0.46)
pop	0.03***	0.02**	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
gdpcap	0.59***	0.35***	0.57***	0.33***
	(0.12)	(0.08)	(0.12)	(0.08)
landlocked	−1.00*	−0.38	−1.09**	−0.64
	(0.38)	(0.56)	(0.38)	(0.51)
patience	−0.34		−0.36	
	(0.64)		(0.63)	
risktaking	0.32		0.24	
	(0.49)		(0.49)	
uai		0.01		0.01
		(0.01)		(0.01)
ltowvs		0.00		0.01
		(0.01)		(0.01)
R^2	0.56	0.46	0.60	0.59

Table B.16: Genetics, Religion & GPS

	Single Pref. Dist.	Gen. Dist.		Rel. Dist.	
	(1)	(2)	(3)	(4)	(5)
ldist	-0.59^{***}	-0.68^{***}	-0.68^{***}	-0.59^{***}	-0.60^{***}
	(0.06)	(0.09)	(0.08)	(0.06)	(0.06)
contig	0.49^{***}	0.38^{**}	0.38^{**}	0.49^{***}	0.49^{***}
	(0.14)	(0.13)	(0.13)	(0.13)	(0.14)
colony	0.34^{***}	0.41^{***}	0.40^{***}	0.34^{***}	0.36^{***}
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
rta	0.34^{***}	0.34^{***}	0.33^{***}	0.34^{***}	0.35^{***}
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
lng	-0.07	-0.06	-0.05	-0.06	-0.06
	(0.13)	(0.13)	(0.13)	(0.13)	(0.12)
comleg	0.16^{*}	0.16^{*}	0.15^{*}	0.16^{*}	0.16^{*}
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
leg.qlt	0.15^{***}	0.14^{***}	0.13^{***}	0.15^{***}	0.15^{***}
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
dpati	-0.15	-0.12	-0.13	-0.15	-0.15
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
drisk	$0.50^{\cdot}$	$0.46^{\cdot}$	$0.45^{\cdot}$	0.50^{*}	0.49^{*}
	(0.26)	(0.25)	(0.25)	(0.25)	(0.25)
dposrec	-0.01	0.03	0.02	-0.00	-0.01
	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
dnegrec	-0.53^{***}	-0.53^{***}	-0.52^{***}	-0.54^{**}	-0.55^{**}
	(0.16)	(0.16)	(0.16)	(0.17)	(0.18)
daltr	-0.09	-0.06	-0.05	-0.08	-0.07
	(0.11)	(0.11)	(0.10)	(0.11)	(0.11)
dtrus	0.09	0.10	0.09	0.10	0.10
	(0.18)	(0.19)	(0.19)	(0.18)	(0.18)
gendist_weighted		7.86			
		(5.15)			
gendist_plurality			$6.86^{\cdot}$		
			(4.06)		
reldist_dominant				0.04	
				(0.10)	
reldist_weighted					0.26
					(0.29)
Observations	5112.00	4970.00	4970.00	4970.00	4970.00
Deviance	4556478256897.52	4490405507118.85	4485219877511.58	4542324036171.87	4536843857953.66
Exp./Imp. FE	YES	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The aggregated bilateral exports are estimated via PPML. Models (2) and (3) include genetical distances between populations in two different calculations, whereas specifications (4) and (5) include two version of religious distance. Both distances are taken from Spolaore and Wacziarg (2018) and compared to the GPS' preference distances.

Table B.17: OECD Subset: Preference Distribution

Statistic	N	Mean	St. Dev.	Min	Max
patience	25	0.317	0.416	−0.431	1.071
risktaking	25	−0.078	0.232	−0.792	0.244
posrecip	25	−0.073	0.284	−1.038	0.316
negrecip	25	0.101	0.277	−0.375	0.665
altruism	25	−0.148	0.341	−0.940	0.406
trust	25	0.021	0.260	−0.519	0.532

Notes: The single preferences are normalized to the individual level for the whole GPS sample, while the averages are calculated using only those GPS countries which are also in the OECD. For this reason, the means deviate from zero despite the normalization.

Table B.18: OECD Subset: Sumary Statistics for Distances in Preferences

Statistic	N	Mean	St. Dev.	Min	Max
dpati	600	0.485	0.332	0.0001	1.502
drisk	600	0.249	0.214	0.001	1.036
dposrec	600	0.296	0.272	0.004	1.354
dnegrec	600	0.321	0.224	0.001	1.040
daltr	600	0.386	0.290	0.002	1.346
dtrus	600	0.297	0.217	0.001	1.051
dpref	600	0.339	0.130	0.061	0.712

Notes:

Table B.19: OECD Subset: Standard Gravity

	Basic Grav.	Agg. Pref. Dist.	Agg. Pref. Dist	Single Pref. Dist.	Single Pref. Dist.
	(1)	(2)	(3)	(4)	(5)
ldist	-0.52^{***}	-0.54^{***}	-0.54^{***}	-0.62^{***}	-0.62^{***}
	(0.08)	(0.08)	(0.07)	(0.05)	(0.05)
contig	0.69^{***}	0.64^{***}	0.64^{***}	0.65^{***}	0.65^{***}
	(0.15)	(0.15)	(0.15)	(0.11)	(0.12)
colony	0.27^{*}	$0.23^{\cdot}$	0.20	0.26^{*}	0.22^{*}
	(0.13)	(0.13)	(0.13)	(0.11)	(0.10)
rta	0.56^{***}	0.57^{***}	0.55^{***}	0.47^{***}	0.45^{***}
	(0.13)	(0.11)	(0.11)	(0.12)	(0.12)
lng	0.07	0.24	-0.02	0.09	-0.09
	(0.19)	(0.17)	(0.18)	(0.19)	(0.19)
dpref		$1.16^{\cdot}$	1.45^{*}		
		(0.66)	(0.61)		
comleg			0.29^{***}		0.20^{*}
			(0.08)		(0.09)
leg.qlt			-0.02		-0.12
			(0.11)		(0.12)
dpati				0.41^{**}	0.58^{***}
				(0.15)	(0.14)
drisk				-0.08	-0.15
				(0.51)	(0.54)
dposrec				1.42^{***}	1.42^{***}
				(0.37)	(0.37)
dnegrec				-0.68^{***}	-0.55^{***}
				(0.13)	(0.14)
daltr				-0.07	-0.08
				(0.20)	(0.18)
dtrus				-0.36	-0.33
				(0.35)	(0.35)
Observations	600.00	600.00	600.00	600.00	600.00
Deviance	1067402571727.43	1034332088258.07	1000590596644.01	913472073587.91	896094053924.81
Exp./Imp. FE	YES	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The estimation of aggregated bilateral exports X_{ij} of all members of the OECD included in the GPS dataset is conducted via PPML. The variables of interest are the distances in preferences, included as an unweighted average *dpref* in (2,3) and as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (4,5). Commonalities in legal systems are included in models (3) and (5) due to their potential impact on negotiations, the channel of interest. Model (1) is a standard gravity equation for comparison. Standard errors are clustered to Importer and Exporter fixed effects.

Table B.20: OECD Subset: Differentiated & Non-Differentiated Goods

	Differentiated Goods		Non-Differentiated Goods	
	Agg. Pref. Dist.	Single Pref. Dist.	Agg. Pref. Dist.	Single Pref. Dist.
	(1)	(2)	(3)	(4)
ldist	-0.44^{***}	-0.51^{***}	-0.78^{***}	-0.88^{***}
	(0.08)	(0.05)	(0.08)	(0.08)
contig	0.60^{***}	0.60^{***}	0.71^{***}	0.71^{***}
	(0.15)	(0.12)	(0.17)	(0.15)
colony	0.22	$0.23^{\cdot}$	0.25^{*}	0.30^{**}
	(0.15)	(0.12)	(0.12)	(0.11)
rta	0.69^{***}	0.61^{***}	$0.31^{\cdot}$	0.16
	(0.13)	(0.14)	(0.16)	(0.18)
lng	0.06	0.00	-0.18	-0.28
	(0.21)	(0.23)	(0.21)	(0.19)
comleg	0.27^{***}	0.19^{*}	0.41^{***}	0.32^{**}
	(0.08)	(0.09)	(0.07)	(0.10)
leg.qlt	-0.00	-0.11	-0.02	-0.08
	(0.11)	(0.12)	(0.11)	(0.13)
dpref	1.33^{*}		1.56^{*}	
	(0.55)		(0.79)	
dpati		0.57^{***}		0.55^{***}
		(0.17)		(0.14)
drisk		-0.00		-0.77
		(0.48)		(0.70)
dposrec		1.31^{**}		1.62^{***}
		(0.44)		(0.29)
dnegrec		-0.65^{***}		-0.33
		(0.12)		(0.24)
daltr		-0.02		-0.13
		(0.18)		(0.20)
dtrus		-0.40		-0.23
		(0.41)		(0.32)
Observations	600.00	600.00	600.00	600.00
Deviance	709102727851.82	632675407110.67	396892747008.34	365040317187.53
Exp./Imp. FE	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Bilateral exports are estimated separately for differentiated and non-differentiated goods, which are partitioned using Rauch (1999) three-digit SITC classifications. The variables of interest are the distances in preferences, included as an unweighted average *dpref* in (1,2) and as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (3,4). Standard errors are clustered to Importer and Exporter fixed effects.

Table B.21: OECD Subset: Breadth of Trade

	Basic Grav.	Single. Pref. Dist	Differentiated Goods	Non-Differentiated Goods
	(1)	(2)	(3)	(4)
ldist	-0.09^{**}	-0.09^{***}	-0.04^{*}	-0.16^{***}
	(0.03)	(0.03)	(0.02)	(0.04)
contig	-0.09^{*}	-0.09^{*}	$-0.07^{\cdot}$	-0.13^{*}
	(0.04)	(0.04)	(0.04)	(0.05)
colony	0.09^{*}	$0.07^{\cdot}$	0.05	0.12^{*}
	(0.04)	(0.04)	(0.04)	(0.05)
rta	0.04	0.02	0.00	0.06
	(0.03)	(0.02)	(0.01)	(0.04)
lng	0.06^{**}	0.04	0.04	0.05
	(0.02)	(0.03)	(0.03)	(0.04)
comleg		0.05^{***}	0.03^{**}	0.09^{**}
		(0.01)	(0.01)	(0.03)
leg.qlt		$-0.04^{\cdot}$	-0.04	$-0.05^{\cdot}$
		(0.03)	(0.03)	(0.03)
dpati		0.16^{**}	0.15^{*}	0.20^{***}
		(0.05)	(0.06)	(0.05)
drisk		-0.10	-0.09	-0.12
		(0.06)	(0.06)	(0.10)
dposrec		0.06	0.02	0.16^{**}
		(0.04)	(0.04)	(0.06)
dnegrec		-0.04	-0.02	-0.06
		(0.03)	(0.03)	(0.05)
daltr		-0.00	0.00	-0.01
		(0.04)	(0.03)	(0.07)
dtrus		-0.05	-0.04	-0.08
		(0.06)	(0.05)	(0.07)
Observations	600.00	600.00	600.00	600.00
Deviance	3156.23	3025.02	1727.87	1840.89
Exp./Imp. FE	YES	YES	YES	YES

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: Breadth of Trade is defined as the number of three-digit SITC goods categories with non-zero export values, i.e. $T_{ij} = \sum_c t_{cij}$. The variables of interest are the distances in preferences, included as single variables *dpati, drisk, dposrec, dnegrec, daltr, dtrus* (2). Model (1) is a standard gravity equation for comparison, specifications (3) and (4) estimate differentiated and non-differentiated goods, respectively. Standard errors are clustered to importer and exporter fixed effects.

Table B.22: Summary Statistics for Trade in Partners and Commodities

		Exporter			Importer		
		Mean	Median	Sd	Mean	Median	Sd
Aggregate	Avg. Commodities	87.32	83.7	55.39	87.18	81.79	28.39
	Avg. Partners	26.2	25.11	16.62	26.15	24.54	8.52
Differentiated	Avg. Commodities	60.85	61.66	36.32	60.73	59.02	17.62
	Avg. Partners	18.26	18.5	10.9	18.22	17.71	5.29
Non-differentiated	Avg. Commodities	26.47	24.33	19.54	26.45	24.9	11
	Avg. Partners	7.94	7.3	5.86	7.93	7.47	3.3

Notes: The table shows the averages for the number of commodities traded between all given country pairs and the averages for the number of partners with which a given country trades for trade in all, differentiated and non-differentiated goods.

Table B.23: Average Commodities Traded

	Second Stage			
	Differentiated Goods		Non-Differentiated Goods	
	Exporter	Importer	Exporter	Importer
	(1)	(2)	(3)	(4)
(Intercept)	121.88*	110.60***	53.96	65.92**
	(55.12)	(31.22)	(34.84)	(20.67)
avg.char	18.38	13.76.	5.67	6.72*
	(12.68)	(7.18)	(5.11)	(3.03)
pop	0.63***	0.25**	0.41***	0.19***
	(0.13)	(0.08)	(0.07)	(0.04)
gdpcap	9.50***	5.01***	5.24***	3.13***
	(2.47)	(1.40)	(1.35)	(0.80)
landlocked	−14.26.	−4.16	−6.80	−3.42
	(7.96)	(4.51)	(4.35)	(2.58)
patience	15.82	7.37	8.72	3.67
	(12.58)	(7.13)	(6.87)	(4.07)
risktaking	−20.99.	0.51	−6.33	−1.37
	(10.65)	(6.03)	(5.83)	(3.46)
posrecip	8.45	−3.10	2.48	−1.05
	(12.76)	(7.23)	(7.01)	(4.16)
negrecip	15.41	1.44	5.74	4.26
	(10.55)	(5.97)	(5.82)	(3.45)
altruism	−11.72	−1.06	−4.00	−0.04
	(12.00)	(6.80)	(6.61)	(3.92)
trust	5.90	0.48	0.21	0.01
	(10.81)	(6.12)	(5.89)	(3.49)
R^2	0.70	0.59	0.69	0.66
Adj. R^2	0.65	0.52	0.64	0.60
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{.}p < 0.1$

Notes: The determinants of average commodities traded by a given country are estimated using OLS and unilateral controls and preferences. The specifications are designed equivalently to those of subsection 2.4.3 Impact on Average Barriers. Columns (1) and (2) show country characteristics for differentiated goods and (3) and (4) for non-differentiated goods. Exporter results are displayed first in each case.

Table B.24: Average Trading Partners

	Second Stage			
	Differentiated Goods		Non-Differentiated Goods	
	Exporter	Importer	Exporter	Importer
	(1)	(2)	(3)	(4)
(Intercept)	36.56*	33.18***	16.19	19.77**
	(16.54)	(9.36)	(10.45)	(6.20)
avg.char	5.51	4.13·	1.70	2.02*
	(3.80)	(2.15)	(1.53)	(0.91)
pop	0.19***	0.07**	0.12***	0.06***
	(0.04)	(0.02)	(0.02)	(0.01)
gdpcap	2.85***	1.50***	1.57***	0.94***
	(0.74)	(0.42)	(0.40)	(0.24)
landlocked	−4.28·	−1.25	−2.04	−1.03
	(2.39)	(1.35)	(1.31)	(0.77)
patience	4.75	2.21	2.62	1.10
	(3.77)	(2.14)	(2.06)	(1.22)
risktaking	−6.30·	0.15	−1.90	−0.41
	(3.19)	(1.81)	(1.75)	(1.04)
posrecip	2.53	−0.93	0.74	−0.32
	(3.83)	(2.17)	(2.10)	(1.25)
negrecip	4.62	0.43	1.72	1.28
	(3.16)	(1.79)	(1.75)	(1.04)
altruism	−3.52	−0.32	−1.20	−0.01
	(3.60)	(2.04)	(1.98)	(1.18)
trust	1.77	0.14	0.06	0.00
	(3.24)	(1.84)	(1.77)	(1.05)
R^2	0.70	0.59	0.69	0.66
Adj. R^2	0.65	0.52	0.64	0.60
Num. obs.	72	72	72	72

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$

Notes: The determinants of average nations traded with by a given country are estimated using OLS and unilateral controls and preferences. The specifications are designed equivalently to those of subsection 2.4.3 Impact on Average Barriers. Columns (1) and (2) show country characteristics for differentiated goods and (3) and (4) for non-differentiated goods. Exporter results are displayed first in each case.

Chapter 3

Economic Preferences, Trade and Institutions

3.1 Introduction

The interest in the effect of formal as well as informal institutions - including cultural factors - on international trade (and on development through trade) and in the interplay among these features has been steadily increasing over the past years. Bringing together aspects from behavioral economics and international trade, we perform an extensive empirical gravity analysis on a comprehensive panel data set of intra- and international trade flows and "economic preferences", using a new state-of-the art identification strategy. As preference measures, we use data from a recent data set of new and unique quality, the Global Preference Survey (GPS) by Falk *et al.* (2018). It includes carefully designed and experimentally validated measures of patience, risk attitude, negative reciprocity and pro-social preferences (positive reciprocity, altruism and trust). We view the observed set of preferences as an interesting bridge on the way from fuzzy definitions of attitudes and cultural proximity towards hard economic transactions and contracts and thereby hope to provide a deeper understanding on the channels between informal and formal institutions and trade.

Exploiting the differential impact on intra- vs. international flows, we identify effects of national economic preferences on external trade while still being able to use the proper exporter- and importer-time fixed effects, which is crucial in order to control for multilateral resistances (Anderson and van Wincoop, 2003). Most prominently, both patience and risk aversion are consistently identified as positive and statistically significant trade-boosting features. In addition to comparing the results with other identification methods and trying to further disentangle the effect channels of preferences on trade, we analyze the interactions between preferences and formal institutions and uncover a substitutive nature between them.

From a theoretical perspective, the observed set of economic preferences may affect trade through several different channels. Can a high level of patience, for example, establish a comparative advantage? Does risk aversion increase the cost of international exchange? While said preferences can arguably play a role in any kind of transaction and contract, several factors are particularly aggravated when it comes to international trade.[1] The shipment of goods may take a significant amount of time, such that a certain degree of patience is needed. As trade relationships are often only intensified over time (e.g. Araujo *et al.*, 2016), more patient firms might also be more willing to build up such long-term partnerships. Also, payments may be delayed or defaulted and the same holds true for the physical delivery of goods. While paying upfront can alleviate some concerns, a considerable degree of risk and a need to trust the partner remain for at least one side of the partnership. Informational frictions are naturally higher about foreign firms and foreign markets in general, which, for example, increases uncertainty about the quality of differentiated goods

[1] Apart from trust (e.g. Guiso *et al.*, 2009), the dimensions of economic preferences have seldom been the direct focus of the trade literature. Still, features like patience have been found to have important complementary roles (see Defever *et al.* (2016), for example).

in particular. Contract enforcement also becomes more difficult over distance, often dealing with different or weak institutional frameworks. However, some proposed channels may often work in different directions. For example, a high degree of risk-aversion may certainly induce firms to shy away from the uncertainties associated with international trade, but it might also provide an intensive for diversification in the sense of insuring against local shocks - both in terms of ensuring constant streams of turnover or in terms of ensuring sufficient goods input. Another example is negative reciprocity, which increases costs of a breach of contract. On one hand, this may diminish the incentive to deviate and thus foster healthy long-term relationships, but the prospect of higher potential costs may also prevent firms to engage in contracts with negatively reciprocal partners in the first place. At a bilateral level, differences or similarities between preferences may again have countervailing effects. While shared perceptions in these dimensions may provide a common ground for negotiating contractual features and align expectations, differences with respect to patience and risk aversion, for example, can also create an additional incentive to trade. When impatient or risk-averse players are willing to pay a respective time or risk premium, this can be exploited by paying in advance or otherwise re-allocating some of the risk burden for patient and more risk-tolerant agents. In the end, the question on the net effect of (each of these) economic preferences on trade becomes an empirical one to a large extent.

Thus, we analyze the direct impact of national preferences on international trade flows via a structural gravity equation. To that extent, we make use of recent methodological advancements in the area of cleanly identifying unilateral effects. The core analysis of the paper builds upon the growing literature that considers and uses intra-national "trade" flows in addition to standard international flows. The effect is then identified as the effect on international trade flows *relative* to internal trade flows. The main advantage of this method is that it allows identification of country-specific, unilateral effects while still being able to control for multilateral resistance terms. Since standard practice does so by using (time-varying) importer and exporter fixed effects (cf. Baldwin and Taglioni, 2007), all exporter- or importer-specific effects get absorbed in these fixed effects since they are perfectly collinear. Therefore, several authors perform regressions without the country fixed effects or using one-sided fixed effects only, see Nordås and Rouzet (2017) and Álvarez *et al.* (2018) for examples from analyses on service regulation and institutional quality, respectively. Still, failing to control for the multilateral resistances has the potential to severely bias gravity estimates, as Anderson and van Wincoop (2003) show in their seminal work. Another approach that is often used is to construct bilateral variables from the respective importer and exporter values, e.g. distance measures. Examples, again from the context of institutions and trade, are Anderson and Marcouiller (2002) and Yu *et al.* (2015), but the interpretation of such effects is not trivial and does not always represent the direct effect that a unilateral variable has on a country. As another alternative, Head and Mayer (2014) and Piermartini and Yotov (2016) suggest a two-step approach that first estimates a gravity equation with the proper

fixed effects and then extracts the exporter and importer fixed effects to regress them on the unilateral variable of interest and other country-specific controls in a second stage. Donaubauer *et al.* (2018) is a recent example and we performed a first analysis on the effect of economic preferences on trade using this technique ourselves (Korff and Steffen, 2019). However, this approach comes with its own challenges and, more importantly, Sellner (2019) provides Monte Carlo simulation evidence that the resulting estimators may again be biased and inconsistent. In contrast, the estimates from the intra-national identification are the only ones that prove to be unbiased and consistent.

While the general use of internal trade flows and the importance of the need to take them into account has initially been brought forward as a way to solve the "distance puzzle" (Yotov, 2012), it has been gradually developed to additionally be used as said method of identifying the effects of unilateral variables by Heid *et al.* (2017) and Beverelli *et al.* (2018). In the context of a variable that may directly affect both domestic and international trade - as is the case for example for the quality of institutions and also the preference variables of interest in this paper here - it is only possible to identify the overall effect on international trade (imports *and* exports) relative to internal trade[2]. The econometric implementation is very simple: the (unilateral) variable of interest only needs to be interacted with a dummy variable on intra-national trade that takes a value of 1 for all domestic "flows" (i.e. the amount of local production that is not exported) and a value of 0 else. This interaction term becomes a bilateral variable by definition and can still be identified in the presence of exporter- and importer-(time) fixed effects. The actual challenge preventing wide-spread use of this method is the availability of data on intra-national trade. It needs to be calculated as the difference of *gross production value - total exports*, data which is not trivially available for all countries, time periods and trade categories. In this paper, we use a comprehensive consistently constructed data set featuring data on 45 countries over 20 years from 27 manufacturing sectors [3].

While we did not find an instrument for an IV approach, the concern for endogeneity of results is generally limited with this type of approach, as Beverelli *et al.* (2018) argue. First, all observable and unobservable country characteristics are controlled for by the use of proper exporter- and importer-time fixed effects. Additionally, drawing from an analogy of the intra dummy to a treatment variable that is independent of any given trade partner choice and does not vary systematically with the preference levels, we know that estimates from such an interaction term are consistent even in the presence of omitted variables (Nizalova and Murtazashvili, 2016).

Qualitatively, our analysis touches upon several further strands of literature: adding on to the first tentative results from our first analysis on this topic (Korff and Steffen, 2019), we obtain statistically significant estimates on the effect of several dimensions

[2]In the case, for example, of a non-discriminatory trade policy that is only affecting external trade by definition, differential impacts on exports and imports can be identified as well (Heid *et al.*, 2017).

[3]The data has been kindly provided to us by Thomas Zylkin.

of economic preferences on trade flows in a much broader and more robust setting by using a panel with intra-national trade flows and interactions with institutions and distance. In particular, high levels of both patience and risk aversion appear to consistently positively affect external trade flows across the board. This does not only inform the literature on culture and trade (cf. Guiso *et al.*, 2009, Lameli *et al.*, 2015, Melitz and Toubal, 2014, and many more), but also the broader literature on preferences' importance for individual as well as aggregate outcomes (e.g Dohmen *et al.*, 2016, Falk *et al.*, 2018).
Another big field that we touch upon is the one of (formal and informal) institutions. Aside from their effect on general economic performance (e.g. Acemoglu *et al.*, 2001, La Porta *et al.*, 1997), the interplay of institutions and trade has received large attention itself (Anderson and Marcouiller, 2002, Araujo *et al.*, 2016, Nunn, 2007, ...) and has been identified as a driver of comparative advantage and specialization patterns, by lowering information and transaction costs, improving the enforcement of contracts and more. Another aspect is the (at least partial) substitutability between formal institutions and informal institutions like shared culture or migrant networks (Briant *et al.*, 2014, Nunn and Trefler, 2014). Another important discussion often included in these analyses is the one of how poor or developing countries are affected by these factors in particular (Beverelli *et al.*, 2018, Lanz *et al.*, 2019, Pascali, 2017). We add to the institutional literature by explicitly examining the interaction effects between formal institutions and economic preferences and find that the preferences can act as an informal substitute in some dimensions and also check for differential effects for trade between poor and rich countries.
The remainder of the paper is structured as follows. Section 2 provides a recap of the gravity framework, discusses the challenges and solutions for determining the effects of country-specific variables -like the national preference levels in our case- and describes the data. In section 3, we present the results of our main identification strategy based on the differential intra- vs. international effect, followed by several interaction and disentanglement analyses and alternative specifications. We end with some concluding remarks and a brief outlook in section 4.

3.2 Empirical strategy and data

3.2.1 Gravity framework

We base our analysis on the well-established gravity framework by Anderson and van Wincoop (2003) that represents bilateral trade flows X_{ij}, between exporter $i = 1, ..., I$ and importer $j = 1, ..., J$ in the following micro-founded equation[4]

[4]See Head and Mayer (2014), Yotov *et al.* (2016) for encompassing reviews on the origins and recent developments of the theoretical and empirical gravity literature. The notation loosely follows Beverelli *et al.* (2018)

$$X_{ij} = T_{ij} \frac{Y_i E_j}{\Pi_i P_j}. \tag{1}$$

T_{ij} traditionally stand for trade costs, with geographic distances standing out as the main driving force in increasing said costs. They may decrease on the other hand through factors such as trade agreements, a shared language and many more. As Beverelli *et al.* (2018) note, T_{ij} can actually include any trade determinant between countries i and j, including unilateral trade drivers (or impediments) such as institutions, or - in our case - national preferences. Y_i and E_j denote the total value of exporter production and importer expenditure, respectively. Π_i and P_j, finally, represent the outward and inward multilateral resistance terms that capture the remoteness of a country:

$$\Pi_i = \sum_j \frac{T_{ij} E_j}{P_j} \tag{2}$$

and

$$P_j = \sum_i \frac{T_{ij} Y_i}{\Pi_i} \tag{3}$$

Two countries will c.p. trade the more with each other, the more isolated each of them is from all other countries. These average trade barriers will be higher if a country is far away (T_{ij}) from (large) markets (E_j, Y_i). Since the two multilateral resistance terms are cross-wise dependent of each other and potentially include unobserved or unobservable factors it becomes computationally and practically challenging to capture these terms empirically.
Depending on the main variable of interest $V_{i(j)(t)}$, an example for a standard modern empirical gravity specification may look like this

$$\begin{aligned} X_{ij(t)} = & \, exp\left(\beta_1 lndist_{ij} + \beta_2 cntg_{ij} + \beta_3 lang_{ij} + \beta_4 clny_{ij} + \beta_5 RTA_{ij(t)}\right) \\ & \times exp\left(\delta V_{i(j)(t)} + \eta_{i(t)} + \mu_{j(t)}\right) + \epsilon_{ij(t)} \end{aligned} \tag{4}$$

The established standard has become to circumvent the problem of directly estimating multilateral resistances by using directional (and time-varying) country fixed effects $\eta_{i(t)}$ and $\mu_{j(t)}$ that control for *all* observable (e.g. output, expenditure, population etc.) and unobservable exporter- and importer-specific characteristics, including the multilateral resistances.[5] Exports X_{ij} (in year t for panel specifications) from country i to country j are a function of bilateral trade cost proxies, a variable of interest $V_{(.)}$ and the exporter- and importer(-time) fixed effects that inherently control for the multilateral resistances. While non-exhaustive, some of the most commonly used trade cost controls included here are the geographical distance $dist_{ij}$ and dummy variables for contiguity, a common language, colonial history and the presence of an active RTA agreement between countries i and j.

[5]Refer to Baldwin and Taglioni (2007) for a good overview of the proper use of dummies in gravity equations

Following best practice, the regressors enter the equations in their exponential form as they should be estimated with the Poisson Pseudo Maximum Likelihood (PPML) estimator, first proposed by Santos Silva and Tenreyro (2006). Use of the PPML method has important advantages over standard OLS methods. It is robust towards heteroskedasticity of the data, a problem which is often present in trade data. Another feature naturally given in trade data are "zero trade" flows, at least to some extent, depending on the level of aggregation of the data and depending on the observed country sample. The PPML estimator allows to incorporate these zero trade flows into the regression and thereby capture the information that these missing trade flows carry with them. Zero trade flows cannot be used in standard OLS estimations, as the process of log-linearizing would require empirically and theoretically problematic ad-hoc solutions for zero trade flows.
If possible, i.e. when the variable of interest is a bilateral variable with sufficient variation over time, country-pair fixed effects γ_{ij} should be used as well, which additionally control for all observed and unobserved time-invariant characteristics of each i and j pair.

$$X_{ijt} = exp\left(\beta_5 RTA_{ijt} + \delta V_{ijt} + \eta_{it} + \mu_{jt} + \gamma_{ij}\right) + \epsilon_{ijt} \tag{5}$$

It becomes apparent that any time-invariant unilateral country characteristics would be completely absorbed in both cases. In the following, we will describe our main method of identification that deals with this problem and also discuss some alternative approaches.

3.2.2 Identification of country-specific effects

The main variables of interest that this paper is concerned with are the economic preferences that are measured at national levels. As just discussed, any exporter- and importer-specific variables are absorbed by exporter-time and importer-time-fixed effects, which are needed to properly control for multilateral resistance as derived from structural gravity. I.e., no factors affecting a country's propensity to export to all destinations or to import from all origins may be identified in such a standard empirical gravity model (cf. Head and Mayer, 2014). While we will also discuss some previously used alternative methods, recent work by Sellner (2019) shows in an extensive simulation study that the identification method making use of the differential impact between intra- vs. international flows, as originally proposed by Heid *et al.* (2017), is the only one that produces unbiased and consistent estimates.
Intra-national identification. Implementation of the intra-national identification method is simple in principle and only requires two easy modifications to a standard empirical specification. First, intra-national flows need to be included in addition to a standard trade matrix with international flows only. While simple in the final implementation, data on intra-national flows is not trivially available in most cases. Usually they need to be constructed as the difference between *gross* production values - and not *value added* measures - and total exports. Even if the reporting of such

gross production values is gaining more prevalence, this data is not readily available for all countries, periods and all forms of trade, let alone more disaggregate data.
As a second modification, a border dummy $BRDR_{ij}$ is introduced that takes a value of one for all international flows $i \neq j$ only and a value of zero for all *intra*-national flows[6]. This dummy is then interacted with the unilateral variable of interest V:

$$X_{ijt} = exp\left(\boldsymbol{GRAV}_{ij(t)}\boldsymbol{\beta} + \delta_0 BRDR \times V + \eta_{it} + \mu_{jt}\right) + \epsilon_{ijt} \tag{6}$$

The effect of the variable of interest on international trade will then be represented by the coefficient of the interaction term $BRDR \times V$. In equation (6), we are using a vector of potential trade cost controls $\boldsymbol{GRAV}_{ij(t)}$ - which is here also including the non-interacted base of the border dummy variable $BRDR_{ij}$ - instead of the examples in equation (4) for the sake of brevity. Equation (6) will form the basis of our empirical analysis in Section 3.[7]
While a differential impact between exports and imports can additionally be identified for variables such as unilateral trade policies (which may only apply to exports *or* imports by definition), Beverelli *et al.* (2018) show from the example of national institutions that variables potentially applying equally on exports and imports can only be identified in their relative effect on overall international trade vs. internal trade. From a technical side, this means that in the case of national institutions and preferences, the interaction variable $BRDR \times V$ may only be defined from one side, i.e. either as $BRDR_{ij} \times V_i$ or as $BRDR_{ij} \times V_j$. The results will be exactly the same, no matter which of the two is used and both can only identify the effect of a country's preference, institution, etc. on overall imports plus exports relative to domestically consumed production.[8] The same holds true for our preference variables of interest. Besides of the trade cost variables and the main interaction of interest, we are using both exporter- and importer-time fixed effects η_{it} and μ_{jt} to control for, most importantly, multilateral resistances as discussed above and other unilateral characteristics. The remainder error term is described by ϵ_{ijt}.
Alternative methods. Before describing our data and empirical results, we want to briefly discuss some of the previously used methods in dealing with unilateral variables of interest. We will incorporate these into the analysis as sensitivity checks and to provide additional angles of observation. There are two simplistic solutions to circumvent the problem of absorbed variables of interest[9]: one is to use one-sided or alternating fixed effects only, i.e. no importer and exporter fixed effects at the same time or even no country fixed effects at all. Of course, results may be potentially severely biased as they cannot control for multilateral resistances and suffer from the critique brought forward by Anderson and van Wincoop (2003).

[6]The dummy may also be defined vice versa, the qualitative results will be exactly the same as Beverelli *et al.* (2018) show, respectively with reversed signs

[7]The main estimations are performed using the *ppmlhdfe* command by Correia *et al.* (2019a,b).

[8]We refer to Beverelli *et al.* (2018), Heid *et al.* (2017) for the full derivations and proofs of these results.

[9]See Section 1 for some recent examples from the literature making use of these.

The other often used ad-hoc solution is to create a - sometimes more, sometimes less theoretically justified - bilateral combination of the i and j variables (also cf. Head and Mayer, 2014, for a brief overview). While such measures do not violate the structural properties of the gravity model, some of them may be unnatural compared to their unilateral motivation, the effect of a , e.g., distance measure can deviate starkly from the direct effects and the interpretation can become diffuse in any case. As another alternative, Head and Mayer (2014) and Piermartini and Yotov (2016) suggest a more complex two-step approach that first estimates a gravity equation with the proper fixed effects and then extracts the exporter and importer fixed effects to regress them on the unilateral variable of interest and other country-specific controls in a second stage. Donaubauer *et al.* (2018) is a recent example and we performed a first analysis on the effect of economic preferences on trade using this technique before (Korff and Steffen, 2019). However, this two-step procedure comes with its own challenges and, more importantly, Sellner (2019) provides Monte Carlo simulation evidence that the resulting estimators may again be biased and inconsistent. In contrast, the estimates from the intra-national identification are the only ones that prove to be unbiased and consistent.
While having to take the two-step results with a grain of salt, this approach potentially allows us, however, to cross-check our main results and gain some additional insights through which channels the preferences affect trade, i.e. in how far do they affect the multilateral resistance terms captured as part of the extracted country fixed effects. Also, this method provides a natural point to proceed from towards some additional disentanglement exercises regarding the overall effect of preferences on trade: loosely following the analysis by Donaubauer *et al.* (2018), we follow up the two-step procedure with a regression analysis of two direct measures of trade costs. After estimating basic equation (5), we extract both the importer and exporter fixed effects as well as the pair fixed effects. As part of the basic two-step method (Head and Mayer, 2014), we regress the estimated exporter-time fixed effects $\hat{\eta}_{it}$ on the preference variables V_i, country-specific controls $\boldsymbol{C_i}$ like GDP and on an average trade cost term $\overline{\boldsymbol{GRAV}}_i = (1/N)\sum_j \boldsymbol{grav}_{ij}$:

$$ln\ \hat{\eta}_{it} = \beta_0 + \overline{\boldsymbol{GRAV}}_i\boldsymbol{\beta} + \boldsymbol{C_i}\boldsymbol{\lambda} + \delta_1 V_i + \kappa_t + \psi_{it} \tag{7}$$

κ_t and ψ_{it} describe a time dummy and the error term, respectively. We proceed analogously for the importer-time fixed effects $\hat{\mu}_{it}$.
Similarly to the directional effects, we can also extract estimates of the pair fixed effects $\hat{\gamma}_{ij}$ from equation (5) and use them to construct a direct estimate of bilateral trade costs T_{ijt}:[10]

$$\hat{T}_{ijt} = exp\left(\boldsymbol{GRAV}_{ijt}\hat{\boldsymbol{\beta}} + \hat{\gamma}_{ij} + \hat{\epsilon}_{ijt}\right) \tag{8}$$

Another measure for bilateral trade cost can be calibrated from the directly observed internal and external trade flows with the odds-ratio method (Head and Ries, 2001,

[10]See Donaubauer *et al.* (2018) for details on these procedures.

Novy, 2013). The resulting tariff equivalent τ_{ij} can be interpreted as a wedge between the observed revealed level of trade costs and a frictionless world:

$$\tau_{ij} \equiv \left(\frac{t_{ij}t_{ji}}{t_{ii}t_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{X_{ii}X_{jj}}{X_{ij}X_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1. \tag{9}$$

For this calculation, σ will be set to a value of eight, following Jacks *et al.* (2011). Both the estimated and the calibrated cost measure will then be regressed on the preference variables and controls.

3.2.3 Data

Before we show and discuss the results of our empirical analysis in Section 3.3, we describe our data in Section 3.2.3. The two main distinguishing factors of our data set are the inclusion of intra-national flows with the trade data on one hand and, on the other hand, the set of economic preferences from the Global Preference Survey (GPS) by Falk *et al.* (2018). The intra- and international trade data from 27 manufacturing sectors (ISIC Rev.2, codes 311-389) is available for a total of 69 countries over a period of 20 years, 1986-2006. The preference data is available for a total of 76 countries. However, not all of them match the countries that we have available with intra-national flows. Thus, the final main data set consists of 45 countries for which both preference and intra-national flow data are available.

Economic preferences. The main variables of interest are the economic preferences from the GPS[11] which measures countries' preference structures with respect to patience, risk attitude, negative reciprocity, positive reciprocity, trust and altruism. Preferable features of this survey are its broad scale and comparability of the data for a large set of countries and its careful design and experimental validation. Full details on the design and implementation of the survey are described in Falk *et al.* (2016) and Falk *et al.* (2018).

The first dimension, *patience*, is a straight-forward measure of time preference. More patient agents are more willing to give up something in the present day in order to benefit more at a later point in time. The most patient countries in the sample are Sweden, Netherlands and USA, while the least patient countries include Hungary, Cameroon and Jordan.[12] The measure of *risk attitude* is another standard concept and represents the willingness to take risks and the valuation of more certain payouts compared to risky potentially higher payouts. Countries with the highest degree of risk aversion are Portugal, Cameroon and Hungary. South Africa, Tanzania and Malawi are the most risk tolerant.

Negative reciprocity covers a willingness to take revenge when treated very unfairly, even when doing so comes at additional personal costs, and also a general propensity to punish unjust behavior. The Republic of Korea, France and Turkey tend to behave negatively reciprocal the most, while Morocco, Costa Rica and Malawi are

[11] The data set is available at `https://www.briq-institute.org/global-preferences/home`.

[12] Full country rankings for the preference dimensions are presented in Fig. C.1 in the Appendix.

the least negatively reciprocal countries in the sample. Morocco is also among the most positively reciprocal countries together with Egypt and Iran, but overall, the correlation between positive and negative reciprocity is surprisingly low, i.e. close to zero. The measure of *positive reciprocity* encompasses a willingness to return favors and to exchange "gifts", both in a literal sense and in the sense of the seminal gift exchange literature (cf. Akerlof, 1982). Countries with the lowest levels of positively reciprocal behavior are Mexico, Tanzania and South Africa.
Trust is a simple survey measure of trust towards people in general in the GPS. The most trusting countries are Egypt, China and Hungary, while Cameroon, Japan and Malawi have the lowest tendency to trust others. Last, *altruism* represents the principle of concern for the well-being of others and is measured by a willingness to donate. Countries that show the highest levels of altruism are Egypt, Iran and Morocco. Mexico, Hungary and Tanzania are on the lower end of the scale.
By construction, each preference dimension is normalized to a mean of zero and a standard deviation of one. Thus, positive values represent deviations above the world mean and negative values need to be interpreted as degrees that are below the mean. For most parts of the analysis in this paper, we will use a pro-sociality index that is also reported in the GPS data. It groups the latter three dimensions together that also exhibit high levels of correlation amongst each other and can be conceptually summarized under "pro-social preferences". For the analysis of this paper, we assume the set of preferences to be completely constant over time. There is no time variation in the preference variables, both from a practical side as the data was only technically collected in the year 2012[13], but also from a conceptual side. While the preferences can change over time and over different characteristics at the individual level, the observed national leanings in preferences are usually argued to be by and large persistent.[14]
Trade and intra-national flows. As a standard feature, international trade flows are obtained from the United Nations' Commodity Trade Statistics Database (COMTRADE)[15] and is complemented with data from the Trade, Production and Bilateral Protection (TradeProd)[16] database from CEPII for missing observations. In addition, intra-national flows are crucially needed for the implementation of our identification strategy. As mentioned above, while simple in the final implementation, data on intra-national flows is not often trivially available. They are calculated as the difference between total (manufacturing) production and total (manufacturing) exports. For consistent results, both variables need to be reported in *gross* values. For this, production data from the United Nations' Industrial Statistics database UNIDO is used together with data from the Trade, Production and Pro-

[13]See again Falk *et al.* (2018) for details on the process and timing of the data collection.
[14]Refer for example to the studies on the "ancient origins" of preferences by Galor and Özak (2016) or Becker *et al.* (2018).
[15]The data may be accessed online at `http://comtrade.un.org`.
[16]The TradeProd database is available from `http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=5`.

tection (TPP)[17] database of the World Bank and again from CEPII'S TradeProd dataset. Baier *et al.* (2019) describe the process in more detail.[18]

Gravity variables. The standard gravity variables including bilateral *and* intra-national distances and dummies for a shared official language, contiguous borders and a colonial relationship are obtained from CEPII's GeoDist database (Mayer and Zignago, 2011).[19] Unilateral variables such as population, GDP and other national characteristics are also used from CEPII (Head *et al.*, 2010) for our alternative specifications. Data on regional trade agreements (RTAs) comes from Mario Larch's Regional Trade Agreements Database[20] from Egger and Larch (2008), who bases it on the original RTA data from the WTO[21].

Institutions and development. In order to complement our gravity and preference data and to construct the interaction terms of preferences and institutional quality, we employ data from the World Bank's World Governance Indicators (WGI) database.[22] The WGI data includes measures of formal institutional quality in the six dimensions of Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. To keep our analysis concise, we use a single averaged institutional quality index for most parts of the paper. Like the data on preferences, the institutional variables are centered around zero with values roughly ranging from -2 to 2.

Following the methodological procedure by Beverelli *et al.* (2018), we complement our analysis by distinguishing flows and effects into those between poor and rich countries and vice versa, as opposed to in-group flows. For the classification into the rich and poor categories, we use another database from the World Bank, the Country and Lending Groups classification. Those economies that are reported with 'low-income' or 'lower-middle income' are grouped together as poor countries, while the rest - 'upper-middle income' and 'high-income' countries - is grouped as a rich country. Please refer to the Appendix for a full list and classification of included countries.[23]

[17] TPP data is available from `http://go.worldbank.org/4Z6UU7TO40`, UNIDO at `http://stat.unido.org/`.

[18] A data set including such consistently constructed intra-national flows has been kindly provided to us by Thomas Zylkin.

[19] It is available from `http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=6`.

[20] `http://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html`

[21] `http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx`

[22] The dataset and a detailed documentation can be accessed at `https://info.worldbank.org/governance/wgi/`.

[23] Details on the methodology and the data itself are available from `https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups`. A graphical overview is available at `https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html`.

Table 3.1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.
Internal trade (million US$)	250.94	581.690	0.3	4233.436
Ext. trade (million US$)	1.38	7.142	0	241.537
Patience	0.078	0.418	-0.431	1.071
Risk aversion	0.011	0.294	-0.971	0.792
Negative reciprocity	0	0.268	-0.488	0.665
Prosociality	0.017	0.381	-1.059	0.868
Institutional Quality	0.427	0.893	-1.265	1.97
Distance (km)	7505.67	4498.48	52.47	19369.96
Shared Border	0.031	0.172	0	1
Shared Language	0.116	0.32	0	1
Colonial History	0.035	0.183	0	1
RTA	0.277	0.448	0	1
CU	0.061	0.24	0	1
GDP (million US$)	596344.14	1461834.316	1181.80	13855900

3.3 Results

3.3.1 Main

We start out the analysis with the results of our main identification strategy:

$$\begin{aligned} X_{ijt} = exp\left(\beta_1 lndist_{ij} + \beta_2 cntg_{ij} + \beta_3 lang_{ij} + \beta_4 clny_{ij} + \beta_5 RTA_{ijt}\right) \\ \times exp\left(\beta_6 BRDR_{ij} + \delta_0 BRDR \times V + \eta_{it} + \mu_{jt}\right) + \epsilon_{ijt} \end{aligned} \tag{10}$$

Following the procedure from Beverelli *et al.* (2018), now using the preference variables only instead of institutions[24] provides the results on the effect of preferences on trade, reported in Table 3.2 and described in the following.
The bilateral control variables are largely in line with standard gravity results. The distance coefficient is significantly negative and the compensating factors mostly have the expected positive signs, even if not all are significant in all specifications. The first addition in columns (1) and (2) compared to a classic gravity estimation is the cross-border dummy (BRDR) that is taking a value of 1 for all international trade flows and is zero for all intra-national flows. The dummy on cross-border flows is negative, large and highly significant throughout, representing a considerable "home bias" effect c.p. That is, a country will on average trade a lot more with itself than with any single given bilateral partner. Columns (3)-(8) also control for the general *globalization trend* by including time-varying cross-border dummies. Full results with the yearly coefficients are reported in Table C.2 in the appendix and show that the magnitude of the negative border effect has indeed been decreasing over time.

[24] Akin to Table 1 from their analysis.

Table 3.2: Economic preferences

	All				Hom.		Diff.	
	(1) OLS	(2) PPML	(3) OLS	(4) PPML	(5) OLS	(6) PPML	(7) OLS	(8) PPML
ln Distance	-1.204**	-0.907**	-1.170**	-0.799**	-1.300**	-0.888**	-1.269**	-0.799**
	(0.061)	(0.057)	(0.060)	(0.057)	(0.058)	(0.052)	(0.065)	(0.066)
Shared Border	0.098	0.384**	0.125	0.376**	0.059	0.307*	0.188	0.439**
	(0.241)	(0.147)	(0.250)	(0.133)	(0.217)	(0.128)	(0.300)	(0.162)
Shared Language	0.535**	0.142	0.597**	-0.021	0.434**	-0.125	0.740**	0.048
	(0.124)	(0.147)	(0.124)	(0.143)	(0.118)	(0.131)	(0.130)	(0.169)
Colonial History	0.522**	0.115	0.460**	0.002	0.559**	0.167	0.462**	-0.072
	(0.161)	(0.164)	(0.160)	(0.164)	(0.149)	(0.158)	(0.163)	(0.176)
RTA	0.046	0.216*	0.044	0.177+	0.053	0.361**	0.074	0.110
	(0.069)	(0.105)	(0.066)	(0.105)	(0.072)	(0.082)	(0.071)	(0.118)
Cross-border dummy	-3.842**	-2.620**	-3.741**	-3.371**	-3.757**	-3.716**	-3.734**	-2.926**
	(0.380)	(0.159)	(0.316)	(0.205)	(0.318)	(0.163)	(0.353)	(0.266)
Patience × BRDR			3.410**	2.165**	2.812**	1.930**	4.168**	2.031**
			(0.530)	(0.249)	(0.554)	(0.180)	(0.562)	(0.333)
Risk aversion × BRDR			2.628**	1.126**	1.553+	0.643+	3.410**	1.104+
			(0.991)	(0.437)	(0.906)	(0.337)	(1.140)	(0.575)
Neg. Rec. × BRDR			2.461**	0.227	2.327**	0.764**	2.350**	-0.213
			(0.758)	(0.259)	(0.739)	(0.213)	(0.871)	(0.325)
Prosociality × BRDR			0.411	-0.420+	0.471	-0.313*	0.209	-0.348
			(0.476)	(0.231)	(0.459)	(0.148)	(0.588)	(0.289)
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Globalization trend	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	40730	42525	40730	42525	39167	42525	39335	42525
R^2	0.874	0.987	0.880	0.991	0.832	0.993	0.896	0.988

This table reports estimation results from a series of econometric models that study the impact of national preferences on international trade. The dependent variables are bilateral exports $X_{ij,t}$ for all PPML regressions and exports in logs for OLS regressions, respectively. Columns (1) & (2) report standard gravity estimates with the addition of a dummy for cross-border trade (BRDR). Columns (3) & (4) introduce the interaction of preferences with the BRDR dummy for aggregate trade flows. Columns (5) & (6) and columns (7) & (8) respectively repeat the estimations for homogeneous vs. differentiated goods only. Standard errors are clustered by country pairs and are reported in parentheses. + p < 0.1, * p < 0.05, ** p < 0.01. See text for further details.

Regarding the analyzed set of preferences, most prominently, higher patience leads to more external relative to internal "trade"[25] for the aggregate sample in columns (3) and (4) as well as for the split samples using trade in differentiated sectors only compared to trade in mostly homogeneous sectors[26] in columns (5)-(8). This is in line with the proposition that patient countries are more willing to deal with the

[25]Throughout the discussion, the term "trade" will be used synonymously with external trade. Whenever we want to talk about intra-national flows, the terms will be specified as "internal trade" or "domestic trade" alternatively.

[26]The manufacturing sectors are assigned to differentiated or homogeneous trade according to the commonly used (Rauch, 1999) classification

time-intensiveness involved in international dealings. As argued earlier, international trade naturally takes more time compared to local trade in terms of actual shipment, but also with respect to communication, negotiation, control and more. Also, patient agents will be more likely to invest in growing relationships with foreign partners that are often only slowly developing and increasing over time, for example by building up a personal reputation.
More risk-averse countries also appear as more trade-intensive overall, which is in contrast to the first intuition that the inherent risk involved in trading internationally may deter risk-averse agents from external trade. This natural effect appears to be compensated by other trade-boosting channels such as a desire to diversify via trade as a form of insurance against local or regional shocks. It makes sense that the effect appears to be more pronounced for trade in differentiated goods. By definition and nature of a homogeneous good, it will be more easily substituted, both in the case of replacing supply channels as well as outlet markets. Hence, the diversification incentive will naturally be at least decreased for homogeneous goods.
The effect for the interaction of the border dummy with negative reciprocity also suggests to be boosting external trade, even if the PPML result is only significant for homogeneous goods. Apparently, the proposed effect in stabilizing contracts is dominating potential trade deterrence effects here. The missing effect for differentiated goods in the preferred PPML specification can be explained by the fact that contracts for differentiated goods should tend to be more stable anyway, since the lack of substitutability translates to a lack of choice in possible replacement partners as well. To further alleviate endogeneity concerns and to check the assumed persistence of the preference variables, we repeat the analysis with a cross-section for the year 1986 only. Results are reported in Table C.3 in the Appendix[27] and - with the caveat of losing statistical power - largely confirm the observed patterns from the panel analysis. Patience has a significant positive effect throughout all specifications while risk aversion appears to matter particularly for trade in differentiated goods and negative reciprocity for trade in homogeneous goods. In line with the "globalization trend" argument, the border effect is significantly stronger for the year 1986 than for the average over the full time period. The fact that the preference data, technically measured in 2014, has significant effects on trade in 1986 supports the idea that the observed national preferences are at its core largely persistent and not, for example, reversely shaped via trade in more recent years.

3.3.2 Institutions

In a next step, we control for institutional quality. Full results from OLS and PPML regressions are available in Tables C.4 and C.5 in the appendix, while we present the concise PPML results in Table 3.3 for the main analysis here. On its own, institutional quality (also interacted with the border dummy) has the expected sig-

[27]Separate cross-section results for all further years are again qualitatively and quantitatively similar and are available upon request.

nificant positive effect on external trade relative to internal trade. Adding both preferences and institutions together into the regressions signals a strong interrelation between the two as the institutional coefficient becomes indistinguishable from zero in the aggregate PPML regression[28]. Splitting the sample by homogeneous and differentiated goods, results are more in line with the ones without institutions. While the institutional quality effect becomes significantly positive again for homogeneous goods, it es even negative at a slightly significant level for differentiated goods. Negative reciprocity still has a significant positive effect for homogeneous goods only, confirming the observation that the stabilizing effect emerges when the breaking up of partnerships would be less costly otherwise. On the other hand, the relative importance of patience and risk aversion seems to become more pronounced for differentiated goods, which naturally come with higher uncertainty and a need for more complex and time-intensive relationships and contracts.

Overall, these results suggest a strong interrelation between institutions and preferences, with patience in particular. As a matter of fact, patience and institutional quality are also highly correlated (0.73). Falk *et al.* (2018) themselves deduce that patience is "arguably not the product of institution", but a high level of patience (i.e. long-term orientation) may certainly play a role in the decision to build up high-quality institutions allowing sustained development (Dohmen *et al.*, 2016). While this particular question shall not be the one of this paper, we introduce an additional interaction term between preferences and institutions to check more explicitly for possible substitutive mechanisms between these two sets of factors.

Interaction. Introducing a formal interaction term regains significance for both (border interacted) base variables of institutional quality and preferences in OLS and PPML estimations. The strong and significant interaction effects with a negative sign indeed suggest that patience and risk-aversion may indeed substitute for bad institutions and vice versa to some extent. The results suggest that a country with bad institutional quality (i.e. IQ_BRDR<0) can soften the negative direct effect of this if it is patient. Potential trading partners would c.p. be deterred by the insecurities associated with a bad institutional quality. However, patient agents would be more willing to convince and reassure partners through external and informal means. In fact, this result is in line with recent results from the trade contract literature from Defever *et al.* (2016), Kukharskyy (2016), who show that only sufficiently patient firms are able to establish efficient long-term supplier collaborations in the face of weak institutions and contract enforcement. In terms of risk attitude, a verbatim interpretation of substitution is not really sensible. However, we can note that a country that has both high institutional quality and is risk-averse will tend to trade less externally than the sum of the direct effects would suggest. As good institutions at home both provide a certain degree of insurance against local shocks and increase the relative risk of dealing with foreign partners,

[28]In the OLS results,it is the patience and risk preference variables that lose their significance while the institutional interaction stays significant, again representing an important interrelation between these factors.

Table 3.3: Preferences and institutions

					Hom.	Diff.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln Distance	-0.923**	-0.970**	-0.799**	-0.852**	-0.938**	-0.842**	-0.792**	
	(0.060)	(0.066)	(0.057)	(0.061)	(0.055)	(0.067)	(0.053)	
Shared Border	0.398**	0.368*	0.376**	0.354**	0.302*	0.410*	0.364**	
	(0.150)	(0.167)	(0.133)	(0.135)	(0.118)	(0.164)	(0.122)	
Shared Language	0.154	0.002	-0.021	-0.016	-0.100	0.078	0.019	
	(0.145)	(0.152)	(0.143)	(0.139)	(0.130)	(0.161)	(0.147)	
Colonial History	0.098	-0.080	0.002	-0.002	0.153	-0.092	-0.012	
	(0.165)	(0.155)	(0.164)	(0.160)	(0.157)	(0.168)	(0.155)	
RTA	0.158	-0.112	0.177+	0.125	0.267**	0.077	0.198*	0.165*
	(0.106)	(0.117)	(0.105)	(0.108)	(0.088)	(0.120)	(0.095)	(0.073)
Cross-border dummy	-2.336**	-2.599**	-3.371**	-3.148**	-3.603**	-2.633**	-3.350**	
	(0.162)	(0.232)	(0.205)	(0.212)	(0.174)	(0.259)	(0.192)	
Inst. Quality × BRDR		0.630**		-0.083	0.276**	-0.338+	0.384*	0.036
		(0.105)		(0.154)	(0.100)	(0.188)	(0.169)	(0.111)
Patience × BRDR			2.165**	2.160**	1.348**	2.388**	3.501**	
			(0.249)	(0.354)	(0.244)	(0.474)	(0.515)	
Risk aversion × BRDR			1.126**	1.117**	0.514+	1.266**	1.471**	
			(0.437)	(0.372)	(0.302)	(0.487)	(0.403)	
Neg. Rec. × BRDR			0.227	0.018	0.734**	-0.452	-0.744	
			(0.259)	(0.251)	(0.219)	(0.304)	(0.510)	
Prosociality × BRDR			-0.420+	-0.381	-0.050	-0.535+	-0.634*	
			(0.231)	(0.263)	(0.159)	(0.324)	(0.323)	
Patience × Inst. Q. × BRDR							-1.603**	0.990**
							(0.280)	(0.271)
Risk aversion × Inst. Q. × BRDR							-1.195**	-0.865
							(0.455)	(0.566)
Neg. Rec. × Inst. Q. × BRDR							0.283	-0.568
							(0.407)	(0.366)
Prosociality × Inst. Q. × BRDR							0.081	-0.345
							(0.350)	(0.276)
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pair FE	No	No	No	No	No	No	No	Yes
Globalization trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42525	16200	42525	16200	16200	16200	16200	16200
R^2	0.987	0.988	0.991	0.990	0.993	0.986	0.991	0.998

This table reports results from a series of PPML estimations that study the joint impact of national preferences and formal institutional quality on international trade. The dependent variable is bilateral exports $X_{ij,t}$. Column (1) reports basic gravity estimates with standard bilateral controls, where columns (2) & (3) add the border-interacted institutional quality and preference variables individually and column (4) includes them jointly for the aggregate sample. Columns (5) & (6) split the sample into estimations for homogeneous vs. differentiated goods only. Columns (7) & (8) add an explicit interaction term between preferences and institutional quality, where column (8) also includes country pair fixed effects. Standard errors are clustered by country pairs and are reported in parentheses.
+ p < 0.1, * p < 0.05, ** p < 0.01. See text for further details.

this is a natural result. On the other hand, a more risk-tolerant country would then still trade relatively more externally, even given its "safe haven" at home and a risk-averse country with bad institutions at home would try to find relatively safer options externally.

Given the time variation in the institutional variable, we can also try to identify an effect with pair fixed effects added into the regression. However, the overall variation is limited in the observed time frame of 1996-2006 as few countries sig-

Table 3.4: Trade of poor nations

	(1)	(2)	(3)	(4)	(5)	(6)
Inst. Quality × BRDR	0.384*	0.665**		0.362*	0.036	0.105
	(0.169)	(0.112)		(0.184)	(0.111)	(0.166)
Inst. Quality$_P$ × BRDR$_{PR}$		0.217		0.457		-0.417*
		(0.295)		(0.313)		(0.195)
Inst. Quality$_P$ × BRDR$_{RP}$		0.826**		0.961**		0.247
		(0.233)		(0.239)		(0.183)
Patience × BRDR	3.501**		2.262**	4.756**		
	(0.515)		(0.283)	(0.857)		
Patience$_P$ × BRDR$_{PR}$			2.318**	2.542**		
			(0.318)	(0.894)		
Patience$_P$ × BRDR$_{RP}$			1.718**	2.646**		
			(0.314)	(0.940)		
Risk aversion × BRDR	1.471**		1.199*	2.156**		
	(0.403)		(0.532)	(0.710)		
Risk aversion$_P$ × BRDR$_{PR}$			0.941**	0.877		
			(0.357)	(0.557)		
Risk aversion$_P$ × BRDR$_{RP}$			0.944*	0.807		
			(0.420)	(0.549)		
Neg. Rec. × BRDR	-0.744		0.159	-1.418**		
	(0.510)		(0.282)	(0.535)		
Neg. Rec.$_P$ × BRDR$_{PR}$			1.046*	0.958*		
			(0.438)	(0.475)		
Neg. Rec.$_P$ × BRDR$_{RP}$			0.756+	0.739		
			(0.443)	(0.568)		
Prosociality × BRDR	-0.634*		-0.693**	-1.154**		
	(0.323)		(0.250)	(0.308)		
Prosociality$_P$ × BRDR$_{PR}$			-0.084	0.320		
			(0.219)	(0.363)		
Prosociality$_P$ × BRDR$_{RP}$			-0.283	0.405		
			(0.216)	(0.320)		
Patience × Inst. Q. × BRDR	-1.603**			-2.283**	0.990**	0.980**
	(0.280)			(0.496)	(0.271)	(0.313)
Patience$_P$ × Inst. Q.$_P$ × BRDR$_{PR}$				-2.700*		-1.957*
				(1.264)		(0.963)
Patience$_P$ × Inst. Q.$_P$ × BRDR$_{RP}$				-2.907*		-0.444
				(1.327)		(0.888)
Risk aversion × Inst. Q. × BRDR	-1.195**			-1.415*	-0.865	-1.314*
	(0.455)			(0.670)	(0.566)	(0.643)
Risk aversion$_P$ × Inst. Q.$_P$ × BRDR$_{PR}$				-1.880*		-2.215**
				(0.830)		(0.777)
Risk aversion$_P$ × Inst. Q.$_P$ × BRDR$_{RP}$				-2.777**		-0.772
				(0.869)		(0.797)
Neg. Rec. × Inst. Q. × BRDR	0.283			0.794+	-0.568	-0.908*
	(0.407)			(0.434)	(0.366)	(0.400)
Neg. Rec.$_P$ × Inst. Q.$_P$ × BRDR$_{PR}$				2.069*		-0.790
				(0.982)		(0.768)
Neg. Rec.$_P$ × Inst. Q.$_P$ × BRDR$_{RP}$				2.360*		-0.800
				(1.072)		(0.773)
Prosociality × Inst. Q. × BRDR	0.081			0.370	-0.345	-0.119
	(0.350)			(0.344)	(0.276)	(0.255)
Prosociality$_P$ × Inst. Q.$_P$ × BRDR$_{PR}$				0.301		-0.224
				(0.683)		(0.326)
Prosociality$_P$ × Inst. Q.$_P$ × BRDR$_{RP}$				1.658*		-1.095**
				(0.670)		(0.275)
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Pair FE	No	No	No	No	Yes	Yes
Globalization trend	Yes	Yes	Yes	Yes	Yes	Yes
Bilateral controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16200	16200	42525	16200	16200	16200
R^2	0.991	0.988	0.992	0.992	0.998	0.999

This table reports results from a series of PPML estimations that study the differential impact of national preferences and formal institutional quality on international trade of poor with rich countries. Columns (1) and (5) replicate columns (7) and (8) from Table 3.3. Columns (4) and (6) distinguish the full set of institutional and preference variables into poor-rich variables, while columns (2) and (3) respectively consider institutional quality and preferences separately. Standard errors are clustered by country pairs and are reported in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. See text for further details.

nificantly changed their level of institutions. Also note that the overall trend was actually negative. Given these caveats, the observed reversed sign for the interaction of patience and institutions should be treated with caution. Still, we try to further disentangle this surprising result by first looking again at potential differences between homogeneous and differentiated goods. While this is not the case for patience, we again see a significant effect emerging for negative reciprocity in homogeneous goods only. This reinforces the earlier argument that the need for stabilizing existing contracts is only present in more easily substituted homogeneous goods trade. Here, the negative sign for the interaction signals that negative reciprocity can even achieve this stabilizing function in substitute of low quality formal institutions. Regarding patience, the last columns show that the substitutive nature at this level of marginal changes in institutional quality only holds when patience and institutions go in opposite directions. That is, above average levels in patience can substitute for bad institutional quality and below average patience can be overcome by good institutions. However, when both go in the same direction, the effects are rather aggravated.

Rich vs. poor. Another angle of this is represented in the results from distinguishing between trade flows when poor and rich countries trade with each other, following again the subsequent analysis of Beverelli *et al.* (2018). Accordingly, we also define for example $IQ_P \times BRDR_{PR}$ for exports of poor to rich countries and continue analogously for each preference (e.g. $Patience_P \times BRDR_{RP}$) and the respective $Preference \times IQ$ interactions. In each case, we substract the two new PR and RP variables from the base variables $IQ \times BRDR$, $Preference \times BRDR$ and $Preference \times IQ \times BRDR$. This allows us to interpret each coefficient independently instead of interpreting it as a deviation from the average effect (cf. Beverelli *et al.*, 2018).

In the final column of Table 3.4 we observe that the substitutive effect (represented by a negative sign of the interaction coefficient) in the pair fixed effects setting reemerges for exports from poor to rich countries. As opposed to a lack in the quality of importer institutions which can be relatively easily circumvented by payment in advance, potential problems of bad exporter institutions such as delivery in time and with sufficient quality cannot be easily overcome upfront. In that sense, the patience of a poor exporter can apparently help to overcome such issues, e.g. by patiently building up a growing long-term relationship and establishing a trustworthy reputation over time. The other results from the basic introduction of preferences, the interaction of preferences and the inclusion of pair fixed effects largely go through when specifically looking at North-South trade.

Table 3.5: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)
Patience$_{exp}$	0.675**	0.742**	1.219**	1.339**	1.183**	
	(0.134)	(0.125)	(0.143)	(0.147)	(0.134)	
Risk aversion$_{exp}$	0.927**	0.912**	1.286**	1.354**	1.160**	
	(0.294)	(0.236)	(0.372)	(0.316)	(0.309)	
Negative reciprocity$_{exp}$	0.092	0.148	0.236	0.337*	0.211	
	(0.136)	(0.124)	(0.169)	(0.170)	(0.157)	
Prosociality $_{exp}$	0.031	0.148	-0.028	0.104	0.092	
	(0.098)	(0.090)	(0.154)	(0.118)	(0.107)	
Patience$_{imp}$	0.106	0.219+	0.717**	0.857**		0.730**
	(0.116)	(0.119)	(0.132)	(0.153)		(0.138)
Risk aversion$_{imp}$	-0.533**	-0.322+	-0.041	0.160		-0.030
	(0.180)	(0.171)	(0.201)	(0.197)		(0.185)
Negative reciprocity$_{imp}$	-0.100	-0.031	0.061	0.166		0.053
	(0.126)	(0.117)	(0.140)	(0.129)		(0.130)
Prosociality$_{imp}$	0.262**	0.404**	0.259+	0.370**		0.378**
	(0.096)	(0.088)	(0.137)	(0.102)		(0.090)
Sq.diff. Patience		-0.029		-0.483	-0.181	-0.140
		(0.274)		(0.310)	(0.294)	(0.293)
Sq.diff. Risk aversion		1.889**		1.606*	0.974	1.277+
		(0.508)		(0.724)	(0.816)	(0.767)
Sq.diff. Neg. Rec.		0.123		-0.011	-0.008	-0.087
		(0.347)		(0.357)	(0.339)	(0.330)
Sq.diff. Prosociality		0.809**		1.295**	1.102**	1.322**
		(0.295)		(0.400)	(0.333)	(0.364)
INTRA			4.509**	4.805**	3.969**	4.455**
			(0.283)	(0.276)	(0.218)	(0.231)
Patience × INTRA			-2.319**	-2.574**	-2.507**	-2.592**
			(0.282)	(0.308)	(0.309)	(0.305)
Risk aversion × INTRA			-1.408*	-1.652**	-1.640**	-1.752**
			(0.621)	(0.567)	(0.470)	(0.494)
Neg. Rec. × INTRA			-0.275	-0.484	-0.464+	-0.490+
			(0.313)	(0.299)	(0.261)	(0.258)
Prosociality × INTRA			0.055	-0.176	0.068	0.021
			(0.303)	(0.237)	(0.196)	(0.200)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Exporter-time FE	No	No	No	No	No	Yes
Importer-time FE	No	No	No	No	Yes	No
Bilateral controls	Yes	Yes	Yes	Yes	Yes	Yes
Unilateral controls	Yes	Yes	Yes	Yes	Yes	Yes
Globalization trend	No	No	Yes	Yes	Yes	Yes
Observations	41580	41580	42525	42525	42525	42525
R^2	0.930	0.932	0.982	0.983	0.989	0.990

This table reports results from a series of PPML estimations studying the impact of economic preferences on trade flows with a varying set of controls & fixed effects. The dependent variable is bilateral exports $X_{ij,t}$. Columns (1) & (2) use international flows only, while columns (3)-(8) add intra-national flows & the respective time-varying intra-national dummies to control for globalization effects. Columns (5) & (6) add one-sided fixed effects for importers & exporters respectively. Standard errors are clustered by country pairs and are reported in parentheses.
+ p < 0.1, * p < 0.05, ** p < 0.01.

Table 3.6: Robustness: Institutions

	(1)	(2)	(3)	(4)
ln Distance	-0.788**	-0.709**	-0.776**	-0.736**
	(0.062)	(0.059)	(0.062)	(0.059)
Shared Border	0.388**	0.405**	0.363**	0.393**
	(0.127)	(0.121)	(0.118)	(0.117)
Shared Language	0.023	0.110	0.051	0.101
	(0.169)	(0.133)	(0.135)	(0.134)
Colonial History	0.001	0.070	0.042	0.032
	(0.160)	(0.152)	(0.157)	(0.150)
RTA	0.119	0.213*	0.167+	0.203*
	(0.100)	(0.087)	(0.097)	(0.092)
CU	0.119	0.284**	0.155	0.177+
	(0.152)	(0.101)	(0.113)	(0.106)
INTRA	3.389**	3.949**	3.690**	3.844**
	(0.223)	(0.242)	(0.237)	(0.232)
Patience × INTRA	-2.138**	-2.397**	-1.910**	-3.203**
	(0.252)	(0.306)	(0.415)	(0.558)
Risk aversion × INTRA	-1.101*	-1.345**	-1.022*	-1.523**
	(0.440)	(0.440)	(0.406)	(0.525)
Neg. Rec. × INTRA	-0.198	-0.380	-0.177	0.154
	(0.257)	(0.251)	(0.228)	(0.482)
Prosociality × INTRA	0.402	0.088	-0.115	0.189
	(0.256)	(0.189)	(0.176)	(0.193)
Sq.diff. Patience		-0.013	-0.146	0.343
		(0.305)	(0.295)	(0.321)
Sq.diff. Risk aversion		1.178	0.542	0.446
		(0.746)	(0.692)	(0.683)
Sq.diff. Neg. Rec.		-0.081	0.020	-0.073
		(0.320)	(0.315)	(0.322)
Sq.diff. Prosociality		1.312**	1.523**	1.104**
		(0.377)	(0.407)	(0.419)
Institutional Quality × INTRA			-0.170	-0.575**
			(0.181)	(0.168)
Institutional Quality × Patience × INTRA				1.480**
				(0.311)
Institutional Quality × Risk aversion × INTRA				1.399**
				(0.486)
Institutional Quality × Neg. Rec. × INTRA				0.109
				(0.368)
Institutional Quality × Prosociality × INTRA				0.072
				(0.260)
Exporter-time FE	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes
Globalization Trend	Yes	Yes	Yes	Yes
Observations	42525	42525	16200	16200
R^2	0.991	0.992	0.991	0.991

This table reports results from a series of PPML estimations studying the interaction of economic preferences and formal institutions in their effect on trade flows. The dependent variable is bilateral exports $X_{ij,t}$. Column (1) repeats the estimation from column (4) of Table 3.2 which includes the main (border/intra-interacted) preference variables and the full set of exporter- and importer-time fixed effects. The following columns add preference distance measures, where estimations (3) and (4) respectively add an aggregate measure of formal institutional quality and an interaction between institutional quality and preferences. Standard errors are clustered by country pairs and are reported in parentheses.
+ p < 0.1, * p < 0.05, ** p < 0.01.

3.4 Robustness

To further check the robustness of the general effect of preferences on trade, we extend the analysis in several different dimensions in this subsection.[29] First, we take "two steps forward and one step back" in a naive baseline by adding the base un-interacted preferences as well as a preference distance measure, at the expense of being able to use the full exporter- and importer-time fixed effects. This is in order to at least get a tentative idea from which direction the overall effect on external vs. internal trade is coming from.
At the same time, we are still importantly controlling for a differential effect on intra- vs. international flows except in columns (1) and (2) in Table 3.5. To ease interpretation, we use the reversed dummy that is taking a value of one for all intra-national flows only, here. I.e., the results can be read in such a way that, for example, a patient country has relatively less domestic consumption (negative coefficient on the INTRA interaction) and exports and/or imports more than an average country. We see the general importance of adding intra-national flows from the fact, that the initially suggested negative effect on imports for risk-averse countries vanishes once we control for the effect of reduced internal consumption. The effect on the exporter side, however, remains positive and significant, suggesting that risk attitude mainly affects trade through the supply side, i.e. through an incentive to diversify firm sales to a broad range of markets. The higher trade intensity of patient countries is also reiterated and appears to be driven by both higher exports and imports, while no clear picture emerges for the effect of negative reciprocity.
One interesting observation to draw from the squared difference measure in preferences is the positive sign for risk attitude, which is at least slightly significant in most specifications. As suggested at the outset, a match between more risk-averse and more risk-tolerant partners can be mutually beneficial and thus foster trade between such countries. Agents that are trying to rid themselves of trade risks and are willing to pay a risk premium should be more likely to find such a suitable partnership in countries that are generally more risk-tolerant.
The estimations in Table 3.6 again control for the full set of exporter-time and importer-time fixed effects and show that our main results on the differential effects of patience and risk attitude on external trade and the interaction with institutional quality are robust towards including the preference distance measure and a currency union control variable.

3.4.1 Two-step

As described in Section 3.2.2, we complement the analysis with the results from a standard two-step approach as suggested by Head and Mayer (2014), where we extract the estimated exporter and importer fixed effects from a first-stage full gravity

[29] Additional robustness checks that repeat part of the analyses with extended specifications, for a larger country sample and with disaggregate data from 27 sectors, are available upon request.

Table 3.7: Two-step

	All			Hom.			Diff.		
	(1) 1st stage: gravity	(2) 2nd stage: exporter	(3) 2nd stage: importer	(4) 1st stage: gravity	(5) 2nd stage: exporter	(6) 2nd stage: importer	(7) 1st stage: gravity	(8) 2nd stage: exporter	(9) 2nd stage: importer
ln Distance	-0.613**			-0.846**			-0.558**		
	(0.044)			(0.044)			(0.052)		
Shared Border	0.436**			0.341**			0.473**		
	(0.094)			(0.077)			(0.115)		
Shared Language	0.352**			0.264**			0.400**		
	(0.087)			(0.085)			(0.094)		
Colonial History	-0.054			0.134			-0.166		
	(0.109)			(0.100)			(0.123)		
RTA	0.528**			0.394**			0.571**		
	(0.070)			(0.066)			(0.083)		
CU	0.375**			0.426**			0.343**		
	(0.103)			(0.101)			(0.126)		
Pop		0.914**	0.753**		0.777**	0.788**		1.160**	0.763**
		(0.061)	(0.036)		(0.080)	(0.032)		(0.105)	(0.045)
GDPpc		0.950**	0.822**		0.942**	0.716**		1.274**	0.860**
		(0.088)	(0.035)		(0.113)	(0.031)		(0.129)	(0.044)
Distance_avg		0.691*	0.407**		0.927*	0.499**		0.303	0.488**
		(0.270)	(0.137)		(0.338)	(0.149)		(0.421)	(0.155)
Border_avg		-3.018	-2.209		1.333	-3.966*		-6.573	-1.838
		(2.563)	(1.476)		(3.008)	(1.605)		(4.412)	(1.665)
Language_avg		-2.987**	-0.528		-1.064	-0.371		-4.781**	-0.598
		(0.766)	(0.450)		(0.947)	(0.426)		(1.550)	(0.509)
Colony_avg		1.209	0.532		0.199	-0.824		2.673	0.877
		(1.347)	(0.643)		(1.308)	(0.612)		(2.560)	(0.774)
RTA_avg		0.080	-0.205		0.132	-0.244		-0.131	-0.118
		(0.411)	(0.234)		(0.568)	(0.226)		(0.730)	(0.281)
CU_avg		-1.435+	-0.307		-0.535	-0.164		-2.720+	-0.051
		(0.737)	(0.411)		(0.681)	(0.458)		(1.314)	(0.477)
Patience		0.940*	0.025		0.350	-0.012		1.592**	0.031
		(0.341)	(0.136)		(0.361)	(0.125)		(0.557)	(0.147)
Risk		0.279	-0.303		-0.331	-0.206		0.932	-0.405+
		(0.497)	(0.188)		(0.552)	(0.137)		(0.756)	(0.198)
Neg.Rec.		-0.430	0.022		-0.461	0.378+		-0.786	-0.059
		(0.290)	(0.162)		(0.306)	(0.191)		(0.482)	(0.177)
Prosocial		-0.226	0.196+		-0.100	0.278**		-0.578	0.207
		(0.258)	(0.100)		(0.284)	(0.092)		(0.442)	(0.121)
Exporter-time FE	x			x			x		
Importer-time FE	x			x			x		
Time FE		x	x		x	x		x	x
Observations	41580	916	928	41580	928	926	41580	918	924
R^2		0.927	0.954		0.882	0.958		0.887	0.941

This table reports estimation results from a two-step procedure (Head and Mayer, 2014) studying the impact of economic preferences on trade through country fixed effects. The dependent variables are bilateral exports $X_{ij,t}$ in the first stage and estimated exporter- or importer(-time) fixed effects respectively in the second stage. Columns (1)-(3) represent the results from the aggregate data. Columns (4)-(6) and (7)-(9), respectively, repeat the procedure for sub-samples of homogeneous and differentiated goods. Standard errors are multi-way clustered by exporter or importer & year and are reported in parentheses. + p < 0.1, * p < 0.05, ** p < 0.01.

estimation as equation (5). The first-stage results are reported in column (1) of Table 3.7. In the second stage, we regress the estimated fixed effects on the set of national economic preferences as our unilateral variable of interest and on further country-specific control variables (cf. equation 7). Column (2) reports the results for the extracted exporter-time FEs and column (3) represents the analogous estimation using importer-time FEs. Columns (4)-(6) and columns (7)-(9) repeat the same exercise while using only subsets of mostly homogeneous sectors and differentiated goods trade only, respectively.
Following again Donaubauer *et al.* (2018), we include population and GDP p.c. as unilateral control variables, which have a large and positive effect as expected. In concordance with Head and Mayer (2014), average measures for the bilateral controls are also included in the second stage estimations (cf. equation (7)). Here, the expected signs for these average trade cost terms are reversed compared to a standard gravity estimation (also cf. Moore, 2018). The reason is the following: by construction, the extracted fixed effects can basically be interpreted as part of the prediction of a trade flow between *each* pair of countries A and B. That is, for example, a high average distance from country A to all countries j, which also implies a high average distance to all countries $j \neq B$, means that country A is generally more remote and thus we can somewhat unintuitively expect higher trade flows between A and B. On the other hand, high average values for trade-cost-reducing factors like a shared language imply a reduced remoteness and thus, less predicted trade flows with any arbitrary partner country. E.g. if country A shares a common language with relatively many countries, we will expect it to trade relatively more with those countries and less with any given random other country.
In light of the aforementioned Sellner (2019) results, we keep the discussion on the preference results short, as the two-step technique does not necessarily provide unbiased and consistent estimates in contrast to the main intra- vs. international identification used before. Still, some of the previous results like the export-boosting effects of patience are reiterated, but a large share of the preferences on importer and exporter side exhibits insignificant effects.

3.4.2 Trade costs

Making further use of the estimation results from equation 7 and deriving the estimated and calibrated trade cost measures from equations 8 and 9 allows us to further decompose and determine the direct effect of preferences on trade costs. We invert the effects, such that we can directly interpret a decrease in trade costs ultimatively as an increase in trade flows. Table 3.8 reports the results.
The coefficients for the bilateral control variables are comparable to a similar analysis from Donaubauer *et al.* (2018) and are reported in the appendix. Our main results of interest are qualitatively comparable between calibrated and estimated costs. Again, the effects of preferences on trade are confirmed, here through its effect on bilateral trade costs. That is, bilateral trade costs appear to be lower between countries that

Table 3.8: Bilateral Trade Costs

	Estimated				Calibrated			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Patience$_{exp}$	5.984**	6.512**	4.568*	7.201**	0.697**	0.724**	0.391+	0.664*
	(0.923)	(0.901)	(1.607)	(1.779)	(0.106)	(0.106)	(0.183)	(0.222)
Risk aversion$_{exp}$	4.634*	5.167**	4.142+	4.681**	0.505*	0.560**	0.424+	0.518*
	(1.898)	(1.592)	(1.845)	(1.300)	(0.222)	(0.185)	(0.216)	(0.174)
Negative reciprocity$_{exp}$	4.633**	4.844**	5.323**	5.237**	0.533**	0.574**	0.619**	0.595**
	(1.210)	(1.217)	(1.219)	(1.207)	(0.139)	(0.141)	(0.142)	(0.152)
Prosociality$_{exp}$	0.437	0.763	1.231	0.800	0.080	0.112	0.157	0.110
	(0.962)	(0.909)	(0.980)	(0.872)	(0.097)	(0.097)	(0.110)	(0.094)
Patience$_{imp}$	4.491**	5.019**	3.416*	3.234+	0.697**	0.724**	0.391+	0.375+
	(0.878)	(0.841)	(1.321)	(1.386)	(0.106)	(0.106)	(0.183)	(0.192)
Risk aversion$_{imp}$	3.225*	3.746**	3.020+	2.938+	0.505*	0.560**	0.424+	0.414
	(1.482)	(1.230)	(1.342)	(1.424)	(0.222)	(0.185)	(0.216)	(0.224)
Negative reciprocity$_{imp}$	4.576**	4.778**	5.016**	5.065**	0.533**	0.574**	0.619**	0.621**
	(1.157)	(1.147)	(1.133)	(1.150)	(0.139)	(0.141)	(0.142)	(0.145)
Prosociality$_{imp}$	0.916	1.248	1.304	1.236	0.080	0.112	0.157	0.150
	(0.837)	(0.758)	(0.822)	(0.858)	(0.097)	(0.097)	(0.110)	(0.115)
Sq.diff. Patience		-2.225+	-2.432+	-1.152		0.067	0.003	0.130
		(1.113)	(1.097)	(1.036)		(0.164)	(0.155)	(0.157)
Sq.diff. Risk aversion		4.625	3.304	2.668		0.738+	0.543	0.514
		(3.130)	(3.065)	(2.576)		(0.356)	(0.406)	(0.370)
Sq.diff. Neg. Rec.		-1.582	-1.433	-1.352		-0.058	0.004	-0.001
		(1.197)	(1.171)	(1.195)		(0.142)	(0.147)	(0.144)
Sq.diff. Prosociality		4.290*	6.074*	5.189+		0.300	0.804*	0.717*
		(2.012)	(2.322)	(2.289)		(0.261)	(0.272)	(0.267)
Institutional Quality$_{exp}$			1.146	1.259+			0.199+	0.225*
			(0.744)	(0.568)			(0.091)	(0.074)
Institutional Quality$_{imp}$			1.054	1.018			0.199+	0.193+
			(0.571)	(0.597)			(0.091)	(0.094)
Patience × Institutional Quality				-2.567*				-0.312*
				(1.050)				(0.130)
Risk aversion × Institutional Quality				-2.891+				-0.493*
				(1.312)				(0.164)
Neg. Rec. × Institutional Quality				-2.498				-0.248
				(1.488)				(0.166)
Prosociality × Institutional Quality				-2.645				-0.229
				(1.411)				(0.132)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bilateral controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	39785	39785	15611	15611	38870	38870	15438	15438
R^2	0.518	0.536	0.556	0.589	0.430	0.437	0.463	0.484

This table reports estimation results from a series of regressions studying the direct impact of economic preferences on trade costs. The dependent variables are inverted logarithmic bilateral trade costs, tij,s. The estimated bilateral trade cost measure in columns (1)–(4) are constructed using estimated pair fixed effects from a full gravity model. Columns (5)–(8) use a calibrated measure of trade costs according to Jacks et al. (2011) and Novy (2013). Standard errors are multi-way clustered by exporter, importer & year and are reported in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

are patient and risk-averse, thus increasing overall trade flows of such countries. In its effect on trade costs, negative reciprocity is now also highly significant and in comparable magnitude to patience and risk. Compared to the previous results, the trade cost channel appears as the one that negative reciprocity mainly works through.
Overall, especially the calibrated results are particularly reassuring for the general importance of the preference channels as the calibration exercise does not rely on potentially problematic or biased pre-estimation or extraction of a trade cost measure. Instead, this measure of trade costs is directly theoretically motivated and relies only on actually observed trade flows.
However, part of this revealed information is incomplete or lost for the ensuing regression, as trade costs for any country pair with a zero trade flow in at least one direction are set to infinity for that year by definition. I.e., while we can deduce that trade costs are prohibitively high in that case, we cannot tell how high exactly and thus cannot mathematically use this information in a non-arbitrary way.

3.4.3 Distance interactions

Given the aforementioned frictions and risks associated with international trade, they tend to become particularly aggravated over increasing distances between trading partners. Thus, it is natural to check if the importance of the observed set of economic preferences is also increasing with larger geographical distances. In Table 3.9, we interact the set of preferences with the geographical distance between the countries in addition to a basic gravity equation. Most prominently, the significant positive signs across the board for the interaction with patience imply that patience becomes more and more important when countries that are far apart trade with each other. As preparation, communication, execution and eventual post-dealings of trade relations take more time over longer distances, it is highly intuitive that especially those countries that are patient build up and intensify such relationships relatively more. The proposed potential for negative reciprocity to act as a informal enforcement channel also appears to be confirmed by the increasing importance over distance. In terms of risk aversion, the effect is most robust and clear for exports in differentiated goods. Given the earlier observation that risk diversification against local shocks seems to play a dominant role, it makes sense that risk-averse countries would trade particularly more with the most geographically distant countries. The negative coefficient for homogeneous goods exports on the patience and risk interaction connects to the findings in Korff and Steffen (2019) and points towards a notion of specialization, as both patient or risk-averse countries shift their production and export mix towards differentiated goods, while they rather import homogeneous goods in return.

Table 3.9: Distance

	All		Hom.		Diff.	
	(1) OLS	(2) PPML	(3) OLS	(4) PPML	(5) OLS	(6) PPML
ln Distance	-1.364**	-0.938**	-1.456**	-0.978**	-1.525**	-1.080**
	(0.053)	(0.068)	(0.058)	(0.062)	(0.056)	(0.080)
Shared Border	0.110	0.451**	0.048	0.350**	0.155	0.492**
	(0.181)	(0.083)	(0.183)	(0.075)	(0.207)	(0.093)
Shared Language	0.434**	0.425**	0.322**	0.260**	0.544**	0.536**
	(0.103)	(0.083)	(0.106)	(0.086)	(0.105)	(0.092)
Colonial History	0.518**	-0.080	0.611**	0.133	0.552**	-0.174
	(0.148)	(0.097)	(0.147)	(0.087)	(0.140)	(0.116)
RTA	0.196**	0.571**	0.128+	0.397**	0.260**	0.628**
	(0.062)	(0.065)	(0.070)	(0.064)	(0.065)	(0.075)
CU	0.389**	0.406**	0.476**	0.458**	0.470**	0.386**
	(0.101)	(0.087)	(0.112)	(0.103)	(0.094)	(0.102)
Exporter Preferences						
Dist. × Patience	0.735**	0.241**	0.497**	-0.152*	0.985**	0.576**
	(0.060)	(0.070)	(0.066)	(0.067)	(0.060)	(0.088)
Dist. × Risk aversion	0.361**	0.161	0.093	-0.500**	0.817**	0.676**
	(0.137)	(0.152)	(0.150)	(0.154)	(0.138)	(0.180)
Dist. × Negative reciprocity	0.243**	0.124+	0.074	0.001	0.427**	0.217**
	(0.086)	(0.067)	(0.096)	(0.066)	(0.089)	(0.073)
Dist. × Prosociality	0.259**	0.215**	0.126	0.021	0.251**	0.291**
	(0.079)	(0.059)	(0.087)	(0.051)	(0.082)	(0.077)
Importer Preferences						
Dist. × Patience	0.524**	0.427**	0.560**	0.412**	0.531**	0.479**
	(0.067)	(0.063)	(0.076)	(0.070)	(0.064)	(0.077)
Dist. × Risk aversion	0.578**	0.128	0.454**	0.138	0.601**	0.181
	(0.124)	(0.150)	(0.139)	(0.167)	(0.124)	(0.164)
Dist. × Negative reciprocity	0.724**	0.320**	0.621**	0.381**	0.683**	0.307**
	(0.090)	(0.070)	(0.099)	(0.074)	(0.097)	(0.078)
Dist. × Prosociality	0.329**	-0.062	0.250*	-0.127+	0.353**	-0.050
	(0.091)	(0.056)	(0.100)	(0.073)	(0.098)	(0.062)
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	39785	41580	38222	41580	38390	41580
R^2	0.883	0.975	0.823	0.962	0.904	0.976

This table reports results from a series of estimations studying the varying importance of economic preferences over distance. The dependent variable is bilateral exports $X_{ij,t}$ from all sectors in columns (1) and (2) and from homogeneous vs. differentiated goods sectors only in columns (3) and (4) and (5) and (6) respectively.
+ p < 0.1, * p < 0.05, ** p < 0.01.

3.5 Conclusion

The question of how informal institutions, including cultural and behavioral factors, can influence international trade flows and economic activity in general has been gaining importance and interest in recent years. In this paper, we provide the most robust evidence to date on the unilateral effects of economic preferences as measured by the GPS on trade. We achieve this by making use of a novel identification strategy that is technically exploiting a unilateral country-specific variable's differential impact on intra- and international trade flows in order to identify an international trade effect while still being able to control for multilateral resistances by the proper fixed effects in a structural gravity type estimation. A recent simulation study by Sellner (2019) has shown that this method - introduced by Heid *et al.* (2017) and further developed by Beverelli *et al.* (2018) - exhibits a superior performance compared to previously suggested identification methods on unilateral effects and is the only one so far that is able to provide unbiased and consistent estimation results.
Constructing a comprehensive trade panel data set with intra-national flows and the behavioral measure of national economic preferences - patience, risk attitude, negative reciprocity and pro-social preferences from the Global Preference Survey (GPS) - and a large set of control variables, we find that especially patience and risk aversion tend to consistently increase external trade. Also analyzing the interaction effects of preferences with formal institutions, we find that high patience may act as a substitute for bad formal institutions and vice versa, while the interplay of institutional quality and risk attitudes provides a systematic picture consistent with motives of risk avoidance and diversification. We provide several robustness checks that further support the observed effects.
The existing analysis can already provide cautious policy implications and additional aspects to consider in the implementation of institutional reforms, foreign aid and more. In particular, policymakers need to be aware of national preference compositions that may work in substitutive or aggravating ways towards formal institutional changes. For example, an improvement in formal institutional quality is likely to be more fruitful with respect to increasing trade flows, i.e. providing higher gains, in countries that are hindered by their lack in patience. In another perspective, firms in generally more risk-averse countries would appear to shift more of their sales or (intermediate) consumption to foreign countries when the national institutional quality falls.
However, driven by the still somewhat limited availability of intra-national trade flow and preference data, the analysis can only provide a restricted look into the effect channels of preferences on trade. Most importantly, the final data set contains a large, but far from world-wide set of 45 countries up until the year 2006 and the flow data only comes from the manufacturing sector. Given that some of the results seem to be driven by distinct specialization patterns, a look into other sectors, later years and more countries could potentially provide more distinguished and further insights. Another interesting avenue for further research is the connection

and potential trade-off between trade flows and FDI, given the observed international differences in preference profiles.

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Appendix

C.1 Supplementary tables and figures

Table C.1: List of countries - countries classified as poor in 2006 in bold

Argentina (ARG), Australia (AUS), Austria (AUT), **Bolivia (BOL)**, Brazil (BRA), **Cameroon (CMR)**, Canada (CAN), Chile (CHL), **China (CHN)**, **Colombia (COL)**, Costa Rica (CRI), **Egypt, Arab Rep. (EGY)**, Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), **India (IND)**, **Indonesia (IDN)**, **Iran, Islamic Rep. (IRN)**, Israel (ISR), Italy (ITA), Japan (JPN), **Jordan (JOR)**, **Kenya (KEN)**, Korea, Rep. (KOR), **Malawi (MWI)**, Mexico (MEX), **Morocco (MAR)**, Netherlands (NLD), **Nigeria (NGA)**, **Philippines (PHL)**, Poland (POL), Portugal (PRT), Romania (ROU), South Africa (ZAF), Spain (ESP), **Sri Lanka (LKA)**, Sweden (SWE), Switzerland (CHE), **Tanzania (TZA)**, **Thailand (THA)**, Turkey (TUR), United Kingdom (GBR), United States (USA)

Table C.2: Economic preferences w/ globalization trend

	All				Hom.		Diff.	
	(1) OLS	(2) PPML	(3) OLS	(4) PPML	(5) OLS	(6) PPML	(7) OLS	(8) PPML
ln Distance	-1.204**	-0.907**	-1.170**	-0.799**	-1.300**	-0.888**	-1.269**	-0.799**
	(0.061)	(0.057)	(0.060)	(0.057)	(0.058)	(0.052)	(0.065)	(0.066)
Shared Border	0.098	0.384**	0.125	0.376**	0.059	0.307*	0.188	0.439**
	(0.241)	(0.147)	(0.250)	(0.133)	(0.217)	(0.128)	(0.300)	(0.162)
Shared Language	0.535**	0.142	0.597**	-0.021	0.434**	-0.125	0.740**	0.048
	(0.124)	(0.147)	(0.124)	(0.143)	(0.118)	(0.131)	(0.130)	(0.169)
Colonial History	0.522**	0.115	0.460**	0.002	0.559**	0.167	0.462**	-0.072
	(0.161)	(0.164)	(0.160)	(0.164)	(0.149)	(0.158)	(0.163)	(0.176)
RTA	0.046	0.216*	0.044	0.177+	0.053	0.361**	0.074	0.110
	(0.069)	(0.105)	(0.066)	(0.105)	(0.072)	(0.082)	(0.071)	(0.118)
Cross-border dummy	-3.842**	-2.620**	-3.741**	-3.371**	-3.757**	-3.716**	-3.734**	-2.926**
	(0.380)	(0.159)	(0.316)	(0.205)	(0.318)	(0.163)	(0.353)	(0.266)
Patience × BRDR			3.410**	2.165**	2.812**	1.930**	4.168**	2.031**
			(0.530)	(0.249)	(0.554)	(0.180)	(0.562)	(0.333)
Risk aversion × BRDR			2.628**	1.126**	1.553+	0.643+	3.410**	1.104+
			(0.991)	(0.437)	(0.906)	(0.337)	(1.140)	(0.575)
Neg. Rec. × BRDR			2.461**	0.227	2.327**	0.764**	2.350**	-0.213
			(0.758)	(0.259)	(0.739)	(0.213)	(0.871)	(0.325)
Prosociality × BRDR			0.411	-0.420+	0.471	-0.313*	0.209	-0.348
			(0.476)	(0.231)	(0.459)	(0.148)	(0.588)	(0.289)
INTL_BRDR_1986			-1.222**	-0.817**	-0.803**	-0.635**	-1.588**	-0.963**
			(0.185)	(0.065)	(0.181)	(0.039)	(0.244)	(0.093)
INTL_BRDR_1987			-1.163**	-0.786**	-0.712**	-0.626**	-1.538**	-0.939**
			(0.173)	(0.065)	(0.175)	(0.037)	(0.229)	(0.094)
INTL_BRDR_1988			-1.090**	-0.689**	-0.638**	-0.515**	-1.448**	-0.846**
			(0.173)	(0.064)	(0.166)	(0.033)	(0.225)	(0.094)
INTL_BRDR_1989			-0.978**	-0.641**	-0.554**	-0.495**	-1.290**	-0.782**
			(0.167)	(0.066)	(0.173)	(0.045)	(0.217)	(0.092)
INTL_BRDR_1990			-0.923**	-0.558**	-0.613**	-0.455**	-1.145**	-0.655**
			(0.158)	(0.062)	(0.159)	(0.045)	(0.205)	(0.087)
INTL_BRDR_1991			-0.834**	-0.538**	-0.491**	-0.467**	-1.066**	-0.623**
			(0.148)	(0.060)	(0.144)	(0.041)	(0.187)	(0.084)
INTL_BRDR_1992			-0.752**	-0.506**	-0.437**	-0.457**	-0.924**	-0.589**
			(0.138)	(0.049)	(0.149)	(0.038)	(0.168)	(0.073)
INTL_BRDR_1993			-0.649**	-0.482**	-0.442**	-0.469**	-0.687**	-0.553**
			(0.128)	(0.045)	(0.143)	(0.031)	(0.160)	(0.066)
INTL_BRDR_1994			-0.542**	-0.404**	-0.306*	-0.410**	-0.660**	-0.452**
			(0.112)	(0.043)	(0.121)	(0.027)	(0.147)	(0.061)
INTL_BRDR_1995			-0.394**	-0.374**	-0.244*	-0.352**	-0.449**	-0.423**
			(0.113)	(0.039)	(0.112)	(0.025)	(0.129)	(0.055)
INTL_BRDR_1996			-0.440**	-0.354**	-0.292**	-0.360**	-0.450**	-0.388**
			(0.103)	(0.037)	(0.098)	(0.024)	(0.124)	(0.052)
INTL_BRDR_1997			-0.263*	-0.255**	-0.179+	-0.282**	-0.260*	-0.271**
			(0.107)	(0.035)	(0.101)	(0.022)	(0.131)	(0.051)
INTL_BRDR_1998			-0.243*	-0.193**	-0.166+	-0.220**	-0.223+	-0.224**
			(0.096)	(0.030)	(0.099)	(0.025)	(0.122)	(0.046)
INTL_BRDR_1999			-0.273**	-0.214**	-0.226*	-0.277**	-0.259*	-0.229**
			(0.093)	(0.033)	(0.099)	(0.023)	(0.113)	(0.044)
INTL_BRDR_2000			-0.232*	-0.117**	-0.252**	-0.225**	-0.279*	-0.101*
			(0.094)	(0.032)	(0.092)	(0.023)	(0.112)	(0.041)
INTL_BRDR_2001			-0.184*	-0.109**	-0.286**	-0.238**	-0.131	-0.076*
			(0.087)	(0.026)	(0.095)	(0.023)	(0.109)	(0.035)
INTL_BRDR_2002			-0.231**	-0.153**	-0.261**	-0.268**	-0.216*	-0.149**
			(0.077)	(0.021)	(0.097)	(0.022)	(0.089)	(0.028)
INTL_BRDR_2003			-0.158**	-0.122**	-0.133+	-0.223**	-0.147+	-0.124**
			(0.055)	(0.015)	(0.079)	(0.022)	(0.077)	(0.024)
INTL_BRDR_2004			-0.096+	-0.061**	-0.153*	-0.127**	-0.069	-0.045**
			(0.051)	(0.011)	(0.071)	(0.012)	(0.057)	(0.014)
INTL_BRDR_2005			-0.078*	-0.053**	-0.072	-0.050**	-0.056	-0.073**
			(0.037)	(0.009)	(0.065)	(0.008)	(0.045)	(0.015)
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	40730	42525	40730	42525	39167	42525	39335	42525
R^2	0.874	0.987	0.880	0.991	0.832	0.993	0.896	0.988

This table reports estimation results from a series of econometric models that study the impact of national preferences on international trade. The dependent variables are bilateral exports $X_{ij,t}$ for all PPML regressions and exports in logs for OLS regressions, respectively. Columns (1) & (2) report standard gravity estimates with the addition of a dummy for cross-border trade (BRDR). Columns (3) & (4) introduce the interaction of preferences with the BRDR dummy for aggregate trade flows. Columns (5) & (6) and columns (7) & (8) respectively repeat the estimations for homogeneous vs. differentiated goods only. Standard errors are clustered by country pairs and are reported in parentheses. + p < 0.1, * p < 0.05, ** p < 0.01. See text for further details.

Table C.3: Economic preferences - 1986

	All				Hom.		Diff.	
	(1) OLS	(2) PPML	(3) OLS	(4) PPML	(5) OLS	(6) PPML	(7) OLS	(8) PPML
ln Distance	-1.074**	-0.868**	-1.056**	-0.760**	-1.062**	-0.840**	-1.138**	-0.828**
	(0.078)	(0.101)	(0.077)	(0.078)	(0.080)	(0.073)	(0.080)	(0.100)
Shared Border	0.089	0.330+	0.123	0.303+	-0.004	0.266	0.147	0.309
	(0.296)	(0.188)	(0.307)	(0.177)	(0.292)	(0.179)	(0.348)	(0.229)
Shared Language	0.194	0.269	0.271+	0.087	-0.056	-0.200	0.642**	0.203
	(0.160)	(0.176)	(0.159)	(0.140)	(0.178)	(0.153)	(0.171)	(0.177)
Colonial History	0.980**	0.198	0.897**	-0.009	0.932**	0.132	0.881**	0.016
	(0.204)	(0.222)	(0.203)	(0.206)	(0.205)	(0.189)	(0.209)	(0.220)
RTA	0.427**	0.485**	0.343*	0.262	0.495**	0.416**	0.472**	0.145
	(0.138)	(0.171)	(0.134)	(0.168)	(0.154)	(0.134)	(0.144)	(0.204)
Cross-border dummy	-4.944**	-3.320**	-5.356**	-4.523**	-5.280**	-4.449**	-5.795**	-4.488**
	(0.423)	(0.268)	(0.334)	(0.256)	(0.334)	(0.227)	(0.349)	(0.349)
Patience × BRDR			4.093**	2.611**	3.164**	2.033**	4.746**	3.182**
			(0.528)	(0.363)	(0.536)	(0.267)	(0.569)	(0.526)
Risk aversion × BRDR			2.568**	1.024	1.268	0.044	2.936**	1.884+
			(0.813)	(0.726)	(0.791)	(0.598)	(0.831)	(1.103)
Neg. Rec. × BRDR			1.874*	0.775*	1.463+	0.767**	1.864+	0.591
			(0.825)	(0.335)	(0.784)	(0.274)	(0.956)	(0.445)
Prosociality × BRDR			0.107	-0.723**	0.404	-0.619**	0.203	-0.602
			(0.513)	(0.267)	(0.470)	(0.211)	(0.634)	(0.367)
Exporter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1804	2025	1804	2025	1688	2025	1674	2025
R^2	0.834 @	0.990 @	0.840 @	0.994 @	0.798 @	0.994 @	0.878 @	0.993 @

This table reports estimation results from a series of econometric models that study the impact of national preferences on international trade. The dependent variables are bilateral exports $X_{ij,t}$ for all PPML regressions and exports in logs for OLS regressions, respectively. Columns (1) & (2) report standard gravity estimates with the addition of a dummy for cross-border trade (BRDR). Columns (3) & (4) introduce the interaction of preferences with the BRDR dummy for aggregate trade flows. Columns (5) & (6) and columns (7) & (8) respectively repeat the estimations for homogeneous vs. differentiated goods only. Standard errors are clustered by country pairs and are reported in parentheses. + p < 0.1, * p < 0.05, ** p < 0.01. See text for further details.

Table C.4: Institutions with OLS

	All								Hom.		Diff.	
	(1) OLS	(2) PPML	(3) OLS	(4) PPML	(5) OLS	(6) PPML	(7) OLS	(8) PPML	(9) OLS	(10) PPML	(11) OLS	(12) PPML
ln Distance	-1.206**	-0.923**	-1.205**	-0.970**	-1.170**	-0.799**	-1.189**	-0.852**	-1.356**	-0.938**	-1.321**	-0.842**
	(0.061)	(0.060)	(0.064)	(0.066)	(0.060)	(0.057)	(0.063)	(0.061)	(0.068)	(0.055)	(0.068)	(0.067)
Shared Border	0.097	0.398**	0.136	0.368*	0.125	0.376**	0.152	0.354**	0.067	0.302*	0.172	0.410*
	(0.241)	(0.150)	(0.248)	(0.167)	(0.250)	(0.133)	(0.250)	(0.135)	(0.236)	(0.118)	(0.315)	(0.164)
Shared Language	0.536**	0.154	0.637**	0.002	0.597**	-0.021	0.668**	-0.016	0.536**	-0.100	0.836**	0.078
	(0.124)	(0.145)	(0.127)	(0.152)	(0.124)	(0.143)	(0.127)	(0.139)	(0.131)	(0.130)	(0.134)	(0.161)
Colonial History	0.521**	0.098	0.337*	-0.080	0.460**	0.002	0.316*	-0.002	0.516**	0.153	0.211	-0.092
	(0.162)	(0.165)	(0.158)	(0.155)	(0.160)	(0.164)	(0.158)	(0.160)	(0.155)	(0.157)	(0.161)	(0.168)
RTA	0.039	0.158	0.098	-0.112	0.044	0.177+	0.102	0.125	0.088	0.267**	0.050	0.077
	(0.069)	(0.106)	(0.073)	(0.117)	(0.066)	(0.105)	(0.072)	(0.108)	(0.083)	(0.088)	(0.079)	(0.120)
IQ_BRDR			1.770**	0.630**			1.260**	-0.083	1.309**	0.276**	1.312**	-0.338+
			(0.285)	(0.105)			(0.425)	(0.154)	(0.410)	(0.100)	(0.473)	(0.188)
patience_exp_brdr					3.410**	2.165**	1.005	2.160**	0.432	1.348**	1.625+	2.388**
					(0.530)	(0.249)	(0.838)	(0.354)	(0.803)	(0.244)	(0.983)	(0.474)
risktaking_exp_brdr					2.628**	1.126**	1.353	1.117**	0.339	0.514+	2.263+	1.266**
					(0.991)	(0.437)	(1.027)	(0.372)	(0.960)	(0.302)	(1.306)	(0.487)
negrecip_exp_brdr					2.461**	0.227	2.504**	0.018	2.756**	0.734**	2.549**	-0.452
					(0.758)	(0.259)	(0.714)	(0.251)	(0.730)	(0.219)	(0.889)	(0.304)
social_exp_brdr					0.411	-0.420+	0.663	-0.381	0.809	-0.050	0.355	-0.535+
					(0.476)	(0.231)	(0.592)	(0.263)	(0.551)	(0.159)	(0.762)	(0.324)
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Globalization Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	40730	42525	15971	16200	40730	42525	15971	16200	15540	16200	15684	16200
R^2	0.874		0.888		0.880		0.890		0.839		0.902	
Adj. R^2		0.987		0.988		0.991		0.990		0.993		0.986

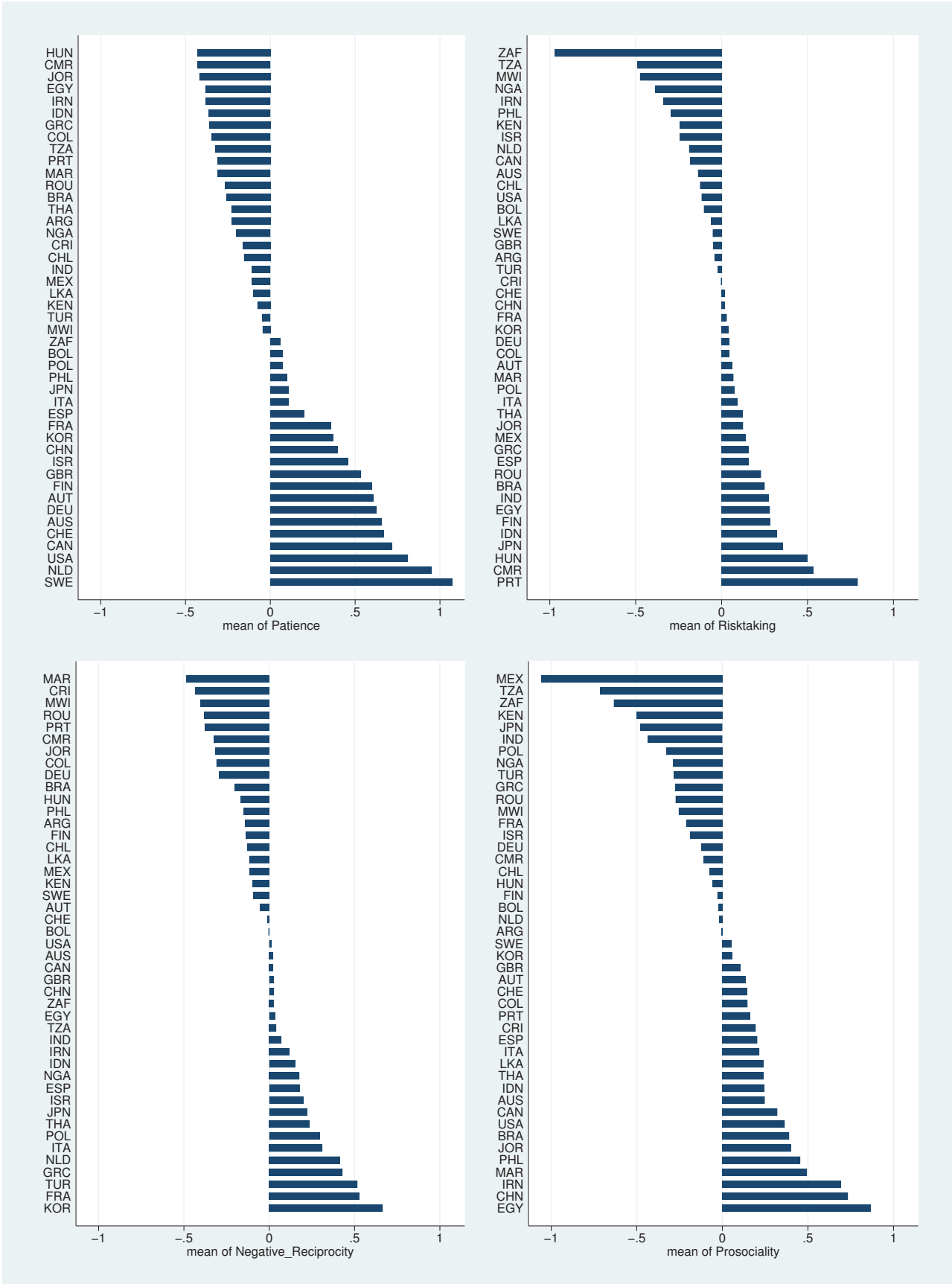
This table reports estimation results from a series of econometric models that study the impact of national preferences on international trade. The dependent variables are bilateral exports $X_{i,j,t}$ for all PPML regressions and exports in logs for OLS regressions, respectively. Columns (1) & (2) report standard gravity estimates with a dummy for intra-national trade. Columns (3) & (4) introduce the interaction of preferences with the intra-national dummy for aggregate trade flows. Columns (5) & (6) and columns (7) & (8) respectively repeat the estimations for homogeneous vs. differentiated goods only. Standard errors are clustered by country pairs and are reported in parentheses.
+ p < 0.1, * p < 0.05, ** p < 0.01. See text for further details.

Table C.5: Interactions with OLS

	Agg.						Hom.		Diff.		Agg. PPML			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	OLS	PPML	OLS	PPML	OLS	PPML	OLS	PPML	OLS	PPML	Pat<0 IQ>0	Pat>0 IQ<0	Both<0	Both>0
ln Distance	-1.189**	-0.852**	-1.196**	-0.792**										
	(0.063)	(0.061)	(0.063)	(0.053)										
Shared Border	0.152	0.354**	0.141	0.364**										
	(0.250)	(0.135)	(0.252)	(0.122)										
Shared Language	0.668**	-0.016	0.675**	0.019										
	(0.127)	(0.139)	(0.126)	(0.147)										
Colonial History	0.316*	-0.002	0.314*	-0.012										
	(0.158)	(0.160)	(0.158)	(0.155)										
RTA	0.102	0.125	0.098	0.198*	0.068	0.180*	0.059	-0.016	0.083	0.342**	0.177+	-0.154	0.183*	0.012
	(0.072)	(0.108)	(0.072)	(0.095)	(0.063)	(0.072)	(0.075)	(0.062)	(0.070)	(0.107)	(0.097)	(0.145)	(0.078)	(0.061)
IQ_BRDR	1.260**	-0.083	1.392**	0.384*	0.295	0.021	0.253	0.080	0.208	-0.284+	-0.991	8.426**	2.007**	-0.405+
	(0.425)	(0.154)	(0.339)	(0.169)	(0.250)	(0.110)	(0.297)	(0.147)	(0.294)	(0.157)	(1.329)	(1.450)	(0.426)	(0.217)
patience_exp_brdr	1.005	2.160**	2.627**	3.501**										
	(0.838)	(0.354)	(0.953)	(0.515)										
risktaking_exp_brdr	1.353	1.117**	1.735*	1.471**										
	(1.027)	(0.372)	(0.773)	(0.403)										
negrecip_exp_brdr	2.504**	0.018	1.887*	-0.744										
	(0.714)	(0.251)	(0.804)	(0.510)										
social_exp_brdr	0.663	-0.381	0.414	-0.634*										
	(0.592)	(0.263)	(0.465)	(0.323)										
Patience_exp × Inst. Q._exp			-1.517*	-1.603**	-0.029	1.011**	-0.254	0.861**	1.142	1.371**	-10.739*	-57.693**	5.712**	1.333**
			(0.603)	(0.280)	(0.657)	(0.259)	(0.693)	(0.278)	(0.747)	(0.341)	(5.376)	(7.529)	(1.874)	(0.415)
Risk aversion_exp × Inst. Q._exp			-1.895*	-1.195**	-0.891	-0.755	-2.115+	-0.865	-0.923	0.353				
			(0.805)	(0.455)	(1.124)	(0.553)	(1.106)	(0.659)	(1.454)	(0.717)				
Neg. Rec._exp × Inst. Q._exp			-0.409	0.283	0.019	-0.416	0.258	-1.874**	-0.068	0.660				
			(0.949)	(0.407)	(0.975)	(0.365)	(1.106)	(0.431)	(1.173)	(0.511)				
Prosociality_exp × Inst. Q._exp			-1.845**	0.081	-1.319+	-0.311	-1.378+	0.149	-0.445	0.300				
			(0.664)	(0.350)	(0.720)	(0.269)	(0.824)	(0.356)	(0.753)	(0.468)				
Exporter-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
dir_id	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Globalization Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15971	16200	15971	16200	15969	16200	15528	16088	15674	16136	2790	1035	5805	6480
R^2	0.8896		0.8906		0.9707		0.9488		0.9678					
Adj. R^2		0.9902		0.9910		0.9995		0.9994		0.9992	0.9992	0.9999	0.9994	0.9997

This table reports estimation results from a series of econometric models that study the impact of national preferences on international trade. The dependent variables are bilateral exports $X_{ij,t}$ for all PPML regressions and exports in logs for OLS regressions, respectively. Columns (1) & (2) report standard gravity estimates with a dummy for intra-national trade. Columns (3) & (4) introduce the interaction of preferences with the intra-national dummy for aggregate trade flows. Columns (5) & (6) and columns (7) & (8) respectively repeat the estimations for homogeneous vs. differentiated goods only. Standard errors are clustered by country pairs and are reported in parentheses.
+ p < 0.1, * p < 0.05, ** p < 0.01. See text for further details.

Figure C.1: Country rankings for patience, risk aversion, negative reciprocity and the prosociality index



Eidesstattliche Versicherung

Ich, Herr M. Sc. Nico Steffen, versichere an Eides statt, dass die vorliegende Dissertation von mir selbstständig, und ohne unzulässige fremde Hilfe, unter Beachtung der „Grundsätze zur Sicherung guter wissenschaftlicher Praxis an der Heinrich-Heine-Universität Düsseldorf“ erstellt worden ist.

Düsseldorf, 26. Februar 2020 _____